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Studies in Experimental Atherosclerosis

I. Preparation of Injectable Cholesterol Sols

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IN THIS FIRST ARTICLE OF A SERIES ON EXPERIMENTAL ATHEROSCLEROSIS THE HISTORICAL DEVELOPMENT ON THE PREPARATION OF INJECTABLE CHOLESTEROL SOLS AND THE PROCEDURE USED IN THE LABORATORY OF THE QUINCY CITY HOSPITAL ARE OUTLINED.

CHOLESTEROL sols have been prepared repeatedly for various purposes. Mostly, colloidal suspensions were used to study cholesterol metabolism. Sometimes they were employed in attempts to enhance our knowledge as to the mode of development of atherosclerosis.

Because of a lack of information concerning previous work and because of the great difficulty entailed in the collection of pertinent references we would like to present a survey of the bibliography on this subject.

HISTORICAL DATA

Preparation of colloidal cholesterol suspensions dates back to the year 1908 and to the work of Porges and Neubauer (28). The two investigators incubated cholesterol dissolved in hot acetone for seven hours at 56 to 60 C., added this solution in small portions to water, slowly evaporated the mixture, and repeated this process until an 0.2 per cent concentration of cholesterol was reached.

Rona and Deutsch (32) and Stuber (35) adjusted the cholesterol content to 1 per cent and to 0.5 to 3 per cent, respectively, without a change in the original technic. Dewey (12) reversed the process of preparation. Hot distilled water was added to a concentrated solution of cholesterol in acetone, the precipitate was redissolved in acetone and again added to water. The desired strength of the cholesterol sol was obtained by distillation in vacuo.

Kaeser (17) dissolved cholesterol in alcohol and, after evaporation, in acetone. His method was used by Leites (22) and by Derman and Leites (11). Acetone was replaced by Garschin (14) with alcohol to make a 2.5 to 5 per cent cholesterol suspension. Stern (34) was the first to observe that the cholesterol sol is sensitive to changes of the reaction of the vehicle. He adjusted the pH of suspensions to 7.039.

An important modification was brought about by Remesov (29), who dissolved cholesterol in an alcohol-acetone mixture, concentrated the solution to 25 per cent by condensation, and dialyzed the resulting sol to obtain a water soluble product. The dispersion was adjusted by ultrafiltration. This suspension was used for experimental purpose by Remesov and Tavaststyerna (30) as well as by Seeman (33) and by Merkulow (24). Evaporation of an acetone solution was replaced by dialysis for two to three hours by Feigenbaum (13), who thus obtained a stable 1 per cent cholesterol sol.

Mutsaars (26) utilized a watery suspension of kaolin which had been saturated with an alcohol solution of cholesterol. Impure, commercial 3 and 5 per cent cholesterol hydrosols were employed by Kaufer (18). A "cholesterol ozonide" was used as emulsifying agent for an alkaline cholesterol solution by Degk-

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witz (9). The same ozonide was stabilized with glucose by Dahmlos (7) and Dahmlos and Solé (8). Moyer (25) used an aqueous cholesterol suspension which had been frozen, powderized, and resuspended before use.

The use of fat solvents as stabilizers for cholesterol suspensions seemed logical. Klotz (21) employed olive oil and cottonseed oil to this end. He also experimented with 7.5 per cent cholesterol in sodium oleate. Cole, Clark, and Womack (6) prepared 2, 3, and 4 per cent cholesterol sols in ether-oleate with the aid of an atomizer. Olive oil with 5 per cent cholesterol added was used by Wacker and Hueck (36), and cholesterol oleate and palmitate suspended in physiologic saline solution were employed by Kawamura (19). Zinserling (38) replaced olive oil with sunflower oil. Wohlwill (37), too, used sunflower oil for his experiments.

Rohrschneider (31) prepared a 5 per cent cholesterol suspension in olive oil and also a suspension in gum arabic. Deicke (10) also prepared two different sols, one with 1.2 per cent cholesterol in olive oil and one with 20 per cent cholesterol and 30 per cent protein in a watery medium.

Coconut oil suspension stabilized with lecithin and containing 0.42 per cent of cholesterol was infused by McKibbin, Ferry, and Stare (23). Nomura (27) prepared an aqueous homogenate of butter, cod liver oil, and lecithin. The cholesterol content of this mixture named "yanol" was 1.04 per cent. Lecithin served as stabilizer to Cashin and Moravek (4). The proportion of lecithin to cholesterol was 1 to 10; ether was substituted for acetone as solvent, and gelatin was added in a saline solution to the hydrosol.

Chamberlain (5) mixed oleic acid and cholesterol, dissolved this mixture in acetone, heated it, and finally added the whole to sodium hydroxide solution. The resulting sol contained 4 per cent cholesterol and was stable for fourteen days. Lauric acid and lactic acid of a pH equal to 4.7 were the vehicle for a 2 to 2.8 per cent cholesterol suspension of Byers and Friedman (1). Sodium stearate in a 1 per cent solution served as stabilizer for a 2.5 per cent cholesterol suspension to Kendall (20) and to Bevans, Abell, and Kendall (2, 3).

Hirsch (15) injected into animals human fat with 4 per cent cholesterol added and also a mixture of 17 cc. of human fat and 16 cc. oleic acid saturated at 37 C with 13 per cent cholesterol. Intravenous infusion of hypercholesteremic blood plasma of one series of chicken to another was made by Horlick, Feldman, and Katz (16).

Experimental

Our efforts centered on the preparation of a stable colloidal cholesterol suspension which could be injected intravenously into experimental animals. Our aim was to ascertain the smallest dose of cholesterol which when introduced into the circulation would produce vascular damage and to determine the shortest span of time in which such vascular alterations could develop.

We found that blood cholesterol levels of rabbits could be increased by transfusion of hypercholesteremic blood. For a single injection, blood of any species could be used. For

multiple transfusions, species-specific blood had to be employed. Such blood was obtained from rabbits fed cholesterol over a long period of time. The method proved tedious. Large quantities of blood had to be used and multiple transfusions had to be given before the blood cholesterol level of recipient animals could be increased appreciably. It further was necessary to render the recipient animals anemic prior to transfusions. Since disturbance of the lipoid metabolism in anemia is common, an artificial factor was thus introduced into the experiments.

Blood plasma or blood serum was used for intravascular administration. Very large quantities of such hypercholesteremic serum had to be employed to influence the blood cholesterol level of the treated animals. The results were analogous to similar experiments with chickens (16).

In order to simplify and to speed up the process of raising the blood cholesterol level of rabbits, fine powderized cholesterol (Pfanstiehl, c.p.) was added first to whole blood and later to blood plasma. In both instances, cholesterol-fibrin precipitates developed. Next, cholesterol was added at 21, 37, and 56 C. to defibrinated blood. It proved insoluble, regardless of the temperature or the length of incubation, which varied from ten to sixty minutes. Finally, cholesterol was added to rabbit serum. Only minute quantities, not exceeding 0.01 mg. per 100 cc. of serum, were found soluble.

Cholesterol was then dissolved in acetone at 60 C., in a mixture of equal parts of acetone and ether (1:1), and in a mixture of absolute ethylalcohol and ether (2:1). Such saturated solutions were added to rabbit serum which had been previously diluted with physiologic saline solution in a proportion of 1 to 10 and the final mixtures evaporated to dryness. Residua were redissolved in distilled water or in saline solution. The sols had twofold disadvantages: 1) they were not stable, and 2) the colloidal particles were too large to pass the capillary network of the lungs when injected intravenously to rabbits. The animals died promptly of pulmonary embolism. Dialysis of the suspensions did not prove helpful. Where evaporation of the cholesterol solvent had been incomplete, hemolysis occurred upon addition of the suspension to rabbit blood.

Further experiments were designed to bring cholesterol into colloidal suspension by homogenization. A Waring blendor and a glass homogenizer were operated for 5, 10, 20, 30, 60, 90, or 120 minutes. Cholesterol was added to 100 cc. of rabbit serum in amounts of 100, 500, 1,000, or 2,500 mg. The size of colloidal particles of cholesterol could be adjusted by three factors: a) the choice of homogenizer, b) the length of homogenization, and c) the amount of cholesterol used. Rabbits' serum was employed as a natural, physiologic stabilizer. The resulting sols were injectable but were poorly tolerated by the rabbits. Also, these suspensions were not stable and within twelve to twenty-four hours partial crystallization of cholesterol occurred in vitro.

A study of the factors responsible for the relative toxicity of cholesterol suspensions in serum revealed that these products were tolerated better when the protein content was low. It was found necessary to adjust the protein content of the serum used as vehicle. Various means of deproteinization were tried and discarded. Ammonium sulfate alone was found suitable. Because of its toxicity, it had to be removed from the serum by dialysis in running tap water for twelve hours. The optimum amount of ammonium sulfate was arrived at empirically. Gradually, 20, 25, 30, and 35 Gm. of solid ammonium sulfate (c.p.) were added to 100 cc. of rabbits' serum. Removal of euglobulin proved sufficient to decrease the total protein level of the serum mixture to the tolerance dose for intravascular injections to rabbits.

Albumin and pseudo-globulin were found necessary to maintain the colloidal character of the preparation. To arrive at the proper balance of protein fractions required for stabilization of cholesterol sols, the amount of ammonium sulfate for precipitation had to be adjusted for each batch of serum. Chemical assays of protein in the serum pool preceeded

the addition of ammonium sulfate. The dialyzed serum was sterilized by passage through a bacterial filter. Under sterile conditions, the desired amount of cholesterol was added and the mixture homogenized. The reaction was measured with a glass electrode pH meter and was found to be between 6.55 and 6.99.

The size of cholesterol particles was estimated by dark-field examination and by nephelometric studies of the suspension. Fine sols had particles measuring 0.02 to 0.04 μ and coarse suspensions had micels of 0.2 and 0.4 μ in diameter.

Our procedure involved the following steps: 1) assays of proteins in a batch of serum, 2) addition of an amount of ammonium sulfate sufficient to remove euglobulins, 3) dialysis to remove the ammonium sulfate, 4) passage through a bacterial filter, 5) addition of cholesterol, 6) homogenization, and 7) control of the suspension for absence of crystals and determination of the size of particles.

Analysis

Most of the methods for preparation of cholesterol sols are elaborate. Many products are impure and most of them are not stable. Crystallization occurs upon standing, as well as in the body, after intravascular injection. Often the colloidal particles of sols prepared according to original prescription are too large to pass the pulmonary capillaries of rabbits. Embolism or shock are the common causes of death of animals injected intravenously with such suspensions. Some of the products are toxic. Reproduction of the preparation of cholesterol sols is not always successful even if the procedures recommended are followed closely.

With the exception of hydrosols, the cholesterol suspensions described in the literature cannot withstand the criticism that the vehicle itself might be harmful to animals. Wohlwill (37) observed embolization of pulmonary arteries caused by sunflower oil which he used as solvent for cholesterol. In the experience of Klotz (21), olive oil injected intravenously to rabbits affected the blood vessels in a similar manner as if cholesterol suspended in olive oil was infused. Our own experiments confirmed this observation. We found this also true of sodium stearate brought into suspension in a manner analogous to the technic employed by us to prepare cholesterol sols.

Our colloidal cholesterol suspensions differed from those of others mainly through the use of serum as a physiologic stabilizer. Exceptionally good stability was achieved by adjusting the protein content of the vehicle, namely by increasing the relative amount of serum albumin and decreasing the amount of globulin fractions. For the same reason injections of such suspensions were well tolerated by rabbits. Kept sterile and in the refrigerator, our cholesterol sols remained stable and injectable for well over a year.

Summary

The literature pertaining to the subject of preparation of colloidal cholesterol suspensions has been reviewed.

A method of preparation of stable injectable cholesterol sols stabilized in partially deproteinized blood serum is presented.

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Serum Alkaline Phosphatase in Middle and Old Age

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MEASUREMENT OF SERUM ALKALINE PHOSPHATASE ACTIVITY IN MEN AND WOMEN BETWEEN THE AGES OF 25 AND 92 INDICATES THAT THE ACTIVITY INCREASES IN BOTH SEXES BETWEEN THE SIXTH AND NINTH DECADES.

ASIDE from the 15 cases of Robertson (13), the 6 cases reported by Vermehren (14), and the 18 males reported by Buch (4) there appears to be no published information concerning the serum "alkaline" phosphatase activity in old age. The data, which are available for the various age groups, are difficult to compare because of the use of different methods of chemical analysis and different definitions of activity. Therefore, it seemed advisable to broaden the rather extensive surveys of plasma alkaline phosphatase in early age (2, 6, 9) and pregnancy (1) to include middle and old age.

METHODS

The micro method of Bessey (3) was used under carefully controlled conditions. The sodium p-nitrophenylphosphate, used as a substrate, was synthesized essentially by the procedure of Huggins (11) and analyzed spectrophotometrically after hydrolysis. Blood samples were collected by finger puncture from the old people and from the middle-aged men, but by venipuncture from the middle-aged women. No difference was found between the alkaline phosphatase activity of plasma and serum, in agreement with the findings of Hoobler (10). The samples of serum or plasma were maintained with "dry ice" for shipment or at –30 C. in a deep freeze until the assays were completed. It should be pointed out that even stoppered tubes containing serum for phosphatase assay stored in the presence of dry ice must be freed from carbon dioxide gas by a tiny stream of air before analysis is commenced. There is enough carbon dioxide in such tubes to produce low and erratic results in the assay. A detailed analysis of this effect has been published (7).

All samples were analyzed within a period of four weeks, during which time no perceptible change in enzyme activity occurs. All samples were analyzed in duplicate and those which did not agree within ± 1.6 per cent were repeated. All results are expressed in units as defined by Bessey (3).

The people from 50 to 90 years of age are unselected residents of the Baltimore City Hospital and Home for the Aged. Ages were obtained from the hospital records and checked by interrogation of the subjects. The individuals below 50 years of age are parents enrolled in the Fels Institute's research program. The latter group included no one with pathologic findings in a routine medical and laboratory examination.

Seasonal changes, if they exist, are ruled out since all samples were collected during May and June. The diet of the patients in both the 50 to 60 and 80 to 90 year groups was the same.

RESULTS AND DISCUSSIONS

Normative Data for Middle and Old Age.— The data obtained are presented in table 1 along with the necessary statistical calculations concerning variability. Three cases have been eliminated from the table since the values exceeded the 4 standard deviations limit which would ordinarily be considered "normal" in a population of this size. These patients or their records were reviewed clinically. For one individual, who was nearly bedfast and has since died, no definite explanation of the high phosphatase level was found. In an-

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other, the determination directed attention to the presence of bone disease. Renal and hepatic findings at autopsy in the third case were highly presumptive of revelant disease, while the parathyroids and bone were not specifically described.

It will be observed that there is a tendency for the range of enzyme activity to increase in the older age groups. Thus, below the age of 50 years the highest value found was 3.90 units, while above this age the range is extended up to 6.35. The greatest variability, as judged by the standard deviation, was in the female group between the ages of 50 and 60 years of age. It is during this period that the greatest change in alkaline phosphatase activity occurs in individuals over the age of 25.

In order to facilitate further discussion and to bring the serum alkaline phosphatase values into perspective, the data has been combined with some previously published (6) for the lower age range and presented in graphic form in figure 1.

Sex Difference.—The sex difference in serum alkaline phosphatase activity which first appears at puberty is maintained until the age of about 50 years. During this time the difference is significant (12) at the 1 per cent level. When one considers that these studies involved populations of different backgrounds and geographic locations, the difference must be regarded as being physiologically significant. During the reproductive phase of life the females have lower phosphatase values than the males, indicating, perhaps, that elaboration of estrogens tends to depress the phosphatase activity of the plasma.

The fact that estrogens depress the activity of carcinomatous bone metastases is well established. The rise in plasma phosphatase activity which occurs during pregnancy does not contradict this conclusion since it has been shown to be very likely due to the elaboration and release of alkaline phosphatase by placental tissue (1). At any rate, there is an abrupt rise in the females at about the age of menopause which eliminates the sex difference (table 2). Conclusive studies of variation in serum alkaline phosphatase activity during the menstrual cycle have not been reported.

Figure 2 reveals that the elevated phosphatase activity found in older women is apparently a rather general finding and is not brought about by the appearance of a few extremely high cases. Such a striking shift of the distribution is not found in the male population. It is also clear, however, that one may find many individuals of both sexes who remain low in all age groups.

Age Changes.—The increase in phosphatase activity, shown in figure 1, between the 50 to 60 and 80 to 90 year age groups is highly significant as can be seen in table 2. The differences found in the younger and older mem-

TABLE 1. ALKALINE PHOSPHATASE OF BLOOD IN 301 MIDDLE-AGED AND OLD INDIVIDUALS.

Age Group	Sex	Average Age	No.	Range	Mean	Sigma (Distribution)
		Years		NPP Units	NPP Units	NPP Units
25.0—29.9	M	26.9	8	1.42—3.90	2.46	0.77
	F	26.6	17	1.06—2.56	1.77	0.42
30.0—34.9	M	32.6	10	1.46—2.87	2.16	0.41
	F	32.6	18	0.99—2.67	1.55	0.53
35.0—39.9	M	37.2	19	0.97—3.96	2.05	0.74
	F	37.5	13	1.07—2.08	1.55	0.31
40.0—44.9	M	41.7	18	1.54—3.73	2.45	0.57
	F	42.3	10	1.25—2.34	1.66	0.39
45.0—49.9	M	46.8	12	1.23—3.44	2.21	0.43
	F	—	—	— —	—	—
50.0—59.9	M	54.7	55	1.13—5.29	2.39	0.80
	F	55.7	23	0.88—5.99	2.51	1.27
60.0—79.9	M	—	—	— —	—	—
	F	—	—	— —	—	—
80.0—84.9	M	81.4	29	0.84—6.02	2.91	1.14
	F	81.5	31	1.31—5.10	2.80	0.89
85.0—92.0	M	87.6	20	1.22—4.97	2.68	0.96
	F	87.9	18	1.73—6.35	2.91	1.06

bers of the highest age group are not significant.

Taurocholate Inhibition.—It has been shown that alkaline phosphatase derived from bone and kidney is inhibited by taurocholate while that from intestine and placenta is not (1, 5, 6, 8). Plasma alkaline phosphatase activity in children behaves very much like that derived from bone (6).

Table 3, in which one case has been excluded because of deviation above 4 standard deviations, reveals the analyses of serum obtained from populations in the sixth and ninth decades of life. The man who was excluded died shortly afterwards from a presumed apoplexy; a successful colonic resection for carcinoma had been performed five years previously. The mean relative activity of 50.7 per cent for the oldest age group is exactly that found for plasma from growing children (6). No sex difference was found in any group studied. However, the age difference in the relative activity of the enzyme in the presence of taurocholate is highly significant ($P < 0.001$). This indicates that the nature, and therefore presumably the source of the enzyme, changes as age increases from the sixth to the ninth decade of life.

Interpretation.—It is possible that a survival factor has influenced the data in the various age groups. If so, a high phosphatase value in the female would be associated with longevity.

If survival factors have not been of prime importance, the data then indicate an increased osteoblastic activity in old age with a sharp

TABLE 2. TESTS OF SIGNIFICANCE OF DIFFERENCES BETWEEN THE MIDDLE AND THE OLD AGE GROUPS

Age Difference		Mean	N	P[1]
Males	Youngest (80—81 yrs.)	2.58	15	0.6
	Oldest (87—92 yrs.)	2.40	15	
Females	Youngest (80—81 yrs.)	2.89	15	0.8
	Oldest (87—92 yrs.)	2.98	15	
Total	(50—59.9 yrs.)	2.42	78	0.01
	(80—92 yrs.)	2.83	98	
	Sex Difference			
Youngest	Males	2.58	15	0.4
	Females	2.89	15	
Oldest	Males	2.40	15	0.15
	Females	2.98	15	
Males	(50—59.9 yrs.)	2.39	55	0.6
Females	(50—59.9 yrs.)	2.51	23	
Males	(80—92.0 yrs.)	2.82	49	>0.9
Females	(80—92.0 yrs.)	2.84	49	

[1] See reference (12).

TABLE 3. TAUROCHOLATE INHIBITION OF PLASMA ALKALINE PHOSPHATASE ACTIVITY.

Sex	N	Average Age	Mean Relative[1] Activity	Sigma	Range
		Years	Per Cent	Per Cent	Per Cent
Males	55	54.7	61.4	10	43—88
Females	23	55.7	63.6	10	49—88
Total	78	55.0	62.0	10	43—88
Males	24	83.8	50.7	10	40—79
Females	43	84.1	50.8	8	28—70
Total	67	84.0	50.7	9	28—79

[1] Taurocholate was added at a concentration of 0.00625 M in the incubation mixture.

rise in females at the age of menopause. The incidence of diseases of the skeletal system increases as age increases. Arthritis, in varying degree, is very common in old age. The principal senile changes in the bones of the skeleton are those of atrophy and osteoporosis.

The finding of a higher serum alkaline phosphatase in old age must apparently be interpreted to mean that, along with the increased osteoclastic activity which is presumably present, there is also some stimulation of osteoblastic activity. The data are difficult to reconcile with the general belief that there is primarily a retarded osteoblastic activity in old age. Perhaps, however, alkaline phosphatase diffuses more rapidly into the plasma from aging bone and other tissues.

Such surveys, which are readily accomplished with micro methods, serve as a means of screening out individuals with abnormal enzyme activity for more intensive study.

SUMMARY

Serum alkaline phosphatase activity has been assayed in 125 individuals between the ages of 25 and 50, 78 between 50 and 60, and 98 between 80 and 92 years of age. The sex difference in enzyme activity which first appears at pubescence is maintained until the sixth decade of life when it disappears as the activity increases sharply in the female. There is a gradual but significant increase in serum alkaline phosphatase activity in both sexes between the sixth and ninth decades. In the group between the ages of 50 and 92 years, 3 cases of abnormally high serum phosphatase were found, only 2 of which were associated with recognizable disease. Taurocholate inhibition studies of the serum enzyme activity reveal that the nature or source of this enzyme may change as age advances. The possible significance of the results in terms of the aging processess and survival factors are discussed.

From the Fels Research Institute for the Study of Human Development, Antioch College, Yellow Springs, Ohio, and the National Heart Institute, National Institutes of Health and the Section on Gerontology, Baltimore City Hospitals, Baltimore, Maryland.

The authors are indebted to Mrs. Elizabeth Strawn for help in scheduling patients, to Mr. Marvin J. Yiengst for assistance in collecting the blood samples, to Miss Elizabeth Snook for statistical analysis, and to Dr. Milton Landowne for clinical review of the cases with abnormal serum phosphatase activity.

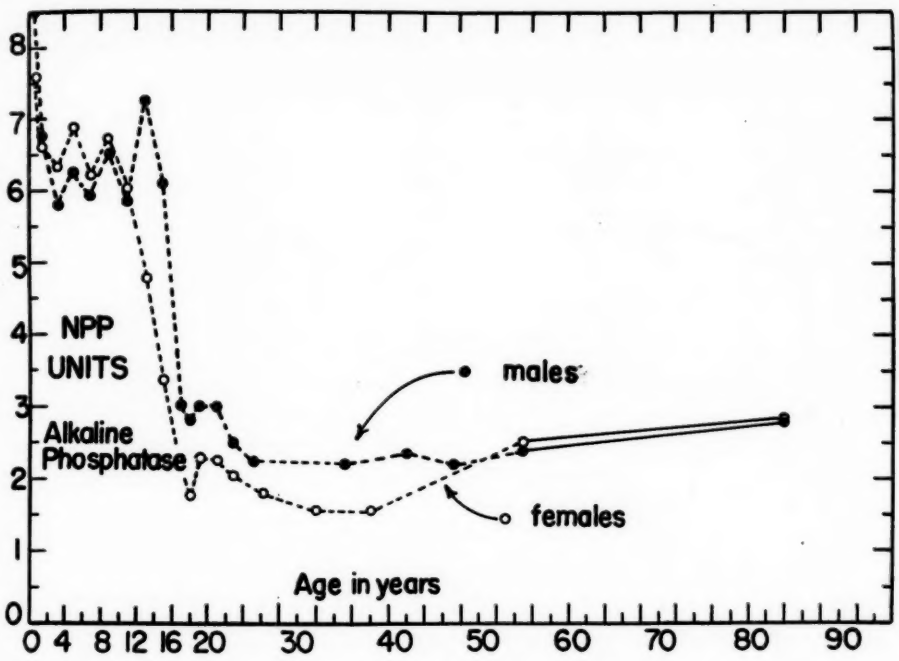

FIG. 1. Average values for plasma alkaline phosphatase according to age. ●.....● Males; O.....O Females.

The 623 cases in the earlier age groups, previously reported (3), have been included for purposes of comparison.

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FREQUENCY DISTRIBUTIONS OF PLASMA ALKALINE PHOSPHATASE DATA FOR VARIOUS AGE GROUPS

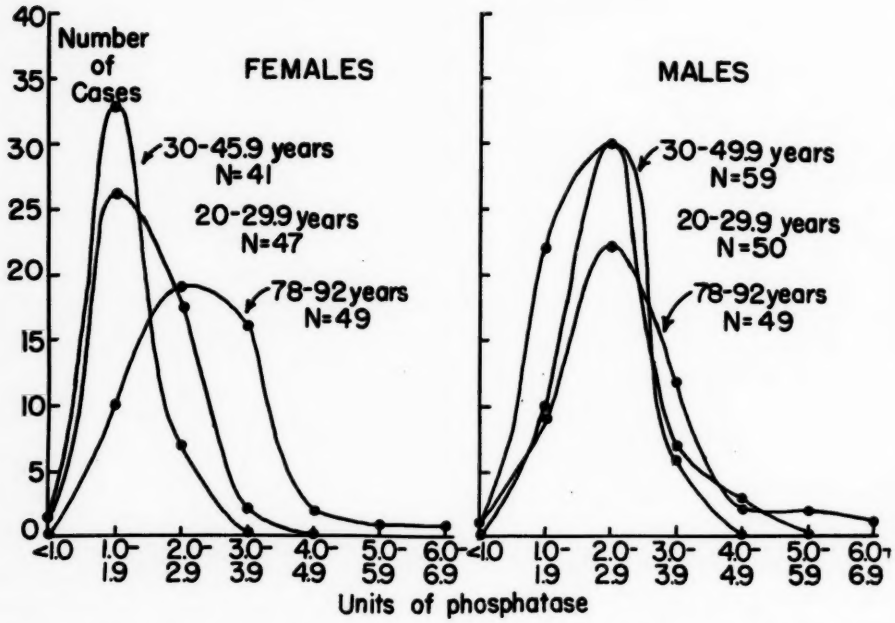

FIG. 2. The 60 cases in the earlier age groups, previously reported (3), have been included for purposes of comparison.

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The Aging Process in the Guinea Pig

JAMES B. ROGERS

DR. ROGERS PRESENTS DATA CONCERNING THE REPRODUCTIVE ACTIVITY IN GUINEA PIGS OF VARIOUS AGES TOGETHER WITH RESULTS OF ANALYSIS OF VARIOUS BLOOD CONSTITUENTS IN THESE ANIMALS. THIS PAPER WAS PRESENTED AT THE SECOND ANNUAL SCIENTIFIC MEETING OF GERONTOLOGICAL SOCIETY, INC. IN CHICAGO, NOVEMBER 5-6, 1949.

THE aging process, as it progresses in animals, is usually interpreted in terms of human pathology or behavior. Undoubtedly many of the changes associated with increasing age are similar in many species. However, considered in detail, a given species has a characteristic life cycle and its metabolic activities follow the pattern of the species. Our common laboratory animals live in a controlled environment, so their longevity, to a large extent, is a product of environment. Guinea pigs, for instance, would not survive the temperature changes and absence of food during the winter if left to care for themselves under natural conditions in this climate.

In an attempt to establish standard age groups which are practical to use in experimental work the aging process in animals has been studied in a colony of guinea pigs.

This colony has been maintained since 1941 without the incidence of epidemic disease. There has been no contact with other species of animals, no new breeding stock, and the minimum of contact with humans. The colony has varied in size from 20 females and 2 males to 388 females and 97 males. The descendants of each of the 20 original females constitute a family. Each family is inbred. Eight of the original families have been eliminated by death from causes other than acute infectious disease.

The animals have been fed uniformly oats, alfalfa hay, cabbage, salt, and water since the colony was started. The oats and cabbage, of good quality, have been bought locally. The source of cabbage varied with the season. The alfalfa hay used was classified as No. 1 Western. The composition of the diet is shown in table 1.

TABLE 1. COMPOSITION OF DIET.

	Water, %	Food Energy, Calories	Protein, Gm.	Fat, Gm.	Total, Gm.	Carbohydrate Fiber, Gm.	Ash, Gm.	Calcium, Mg.	Phosphorus, Mg.	Iron, Mg.
Cabbage, per 100 gms.	92.4	24	1.4	0.2	5.3	1.0	0.8	46	31	0.5
Oats, per 100 gms.	8.35	390	14.2	7.4	68.2	1.2	1.9	53	405	4.5
Alfalfa Hay, per pound	—	—	91	9.1	—	82	—	8550	1000	—

	Vitamin A	Thiamin, Mg.	Riboflavin, Mg.	Niacin, Mg.	Ascorbic Acid, Mg.	Pantothenic Acid, Mg.	Choline, Mg.
Cabbage, per 100 gms.	80 I. U.	0.06	0.05	0.3	50.0	—	—
Oats, per 100 gms.	0 I. U.	0.60	0.14	1.0	0.0	—	—
Alfalfa Hay, per pound	100,000 U.S.P. U.	—	7.0	23.0	—	16.0	400.0

Dr. Rogers received his A.B. degree in 1916 and his A.M. degree in 1917 from the University of Kansas. He was a teaching fellow in zoology at the University of California in 1917. Through 1919-1920 he was an instructor in biology at Tufts College and through 1920-1922 he was instructor in zoology at Kansas State Agricultural College. He received his M.D. from the University of Louisville School of Medicine in 1927.

At the University of Louisville he was an assistant in anatomy from 1923 to 1927, instructor from 1927 to 1928, assistant professor from 1928 to 1933, and associate professor from 1933 to 1938. Since 1938 Dr. Rogers has been a professor of anatomy.

In research his interests have been in the permeability of capillaries, toxemia of pregnancy in the guinea pig, and age changes in the guinea pig.

Groups of animals have had the fat and the protein intake varied by using a commercially prepared food of known composition instead of oats.

The temperature of the animal room has been constant at 72 F. from October to May but has varied with the outside air temperature during the summer months. There is a marked increase in the mortality rate during the summer. The increase takes place chiefly among pregnant females approaching term and senile animals of both sexes.

Animals are usually kept in breeding cages, 7 females and 1 male in a cage. To increase the number of young rapidly, postpartum breeding by Method 1 of Rowlands (2) was carried out. To slow production, when space permitted it, pregnant females were isolated from males before delivery, Method 3 of Rowlands (2). Postpartum breeding definitely increases production. According to Bruce and Parkes (1) 74 per cent of the pregnancies in monogamous pairs are from postpartum mating. Twenty-four females and 10 males were kept until senile without mating.

The animals have been divided into 5 groups, based on actual age expressed in days:

(1)	1 - 210	(days)	Young
(2)	211 - 420	"	Adult (Mature)
(3)	421 - 630	"	Middle-Aged (Post Mature)
(4)	631 - 840	"	Old
(5)	841 - 1050	"	(or more) Senile

Weight, metabolic activity, and reproductivity have been considered in these groups.

Weight is a simple way of estimating age and will differentiate between young and adult animals. If records are kept accurately, senile animals, particularly those who live more than 2190 days, show a marked weight loss.

The metabolic activities, as determined by chemical methods on blood, have been compared in the 5 groups in table 2.

The data show a tendency for plasma calcium to increase with age. The number of observations for the other blood constituents is too small to permit definite conclusions with regard to age changes.

The reproductive activity of both sexes has been recorded. These records cover 388 breeding females and 97 breeding males, the production of 2367 litters with 7965 births. The average age of females at the first litter was 175 days, at the last litter 450 days. Thus, in the average female, which produced 3 litters, reproductivity was finished during middle age. Litters varied in size from 1 to 8, the average being 2.3. However, some females had the first litter at 93 days of age, and one female had her seventeenth, and last, litter at 2173 days of age. Males were fertile as early as 32 days and as late as 1760 days of age.

The reproductive histories of 60 breeding males (fig. 1) and 60 breeding females (fig. 2), all living more than 841 days, were studied. There was a sharp decline in reproduction in both sexes between age 1050 days and age 1260 days. This decrease in reproduction is probably valid evidence of senility. Therefore any guinea pig that survives three years is definitely senile.

In 1949 the average age at death of breeding males was 850 days; that of breeding females 540 days. Deaths associated with pregnancy or delivery account for females living approximately 300 days less than males.

TABLE 2. BLOOD CONSTITUENTS BY AGE GROUPS.

	Young	Adult	Middle Age	Old	Senile
Glucose (mg. %)	111.3	109.7	110.4	105.8	112.2
Range	97.8–139	100–116	99–141	91.1–117	93.2–170.6
No. of Animals	9	13	16	6	8
Total Protein (gm. %)	5.1	5.8	5.9	5.8	6.0[1]
Range	4.3–5.7	5.0–6.5	5.0–6.9	5.8	5.2–6.8
No. of Animals	20	5	5	1	4
Total Cholesterol (mg. %)	42	13.8	41	—	4.6
Range	21.5–87.2	13.8	22–60	—	4.6
No. of Animals	21	1	7	—	1
Lipid Phosphorus (mg. %)	2.1	4.5	2.8	2.3	0.6
Range	2.1	2.7–5.4	2.2–3.8	2.3	0.6
No. of Animals	1	3	4	1	1
Calcium (mg. %)	11.5	11.5	13.9	13	14.5
Range	11.2–11.7	10.8–12.1	13.9	13	13–16.7
No. of Animals	2	2	1	1	4
Phosphorus (mg. %)	4.2	3.4	4.5	3.6	4.9
Range	3.9–4.5	1.8–4.9	3.6–5.3	3.6	4.3–6.4
No. of Animals	2	2	3	1	4
Uric Acid (mg. %)	1.9	—	2.7	2.0	3.3
Range	1.7–2.2	—	2.2–3.1	1.3–2.5	2.1–4.6
No. of Animals	2	—	3	3	4

[1] Animals were not starved 18 hours before blood determinations were carried out.

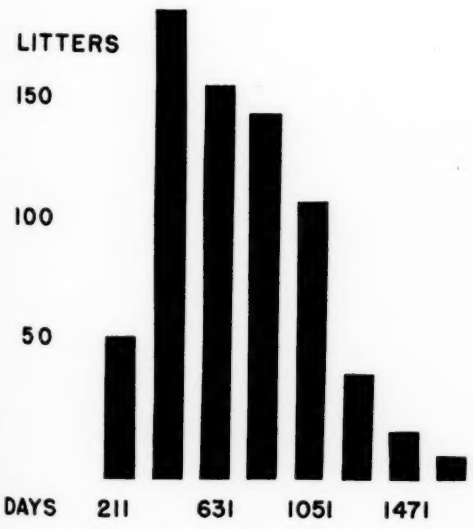

FIG. 1. Litters according to age of sire.

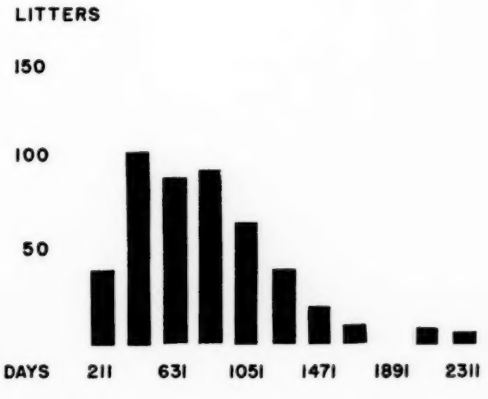

FIG. 2. Litters according to age of dam.

Summary

Measurements of weight in guinea pigs constitute a practical method of estimating age. The decrease in reproductive activity after three years of survival is found to be definite evidence of senility. The concentration of plasma calcium shows a tendency to increase with advancing age.

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Vitamin Studies in Middle-Aged and Old Individuals

VI. Tocopherol Plasma Concentrations

MARGARET CHIEFFI AND JOHN ESBEN KIRK

FURTHER VITAMIN STUDIES BY DRS. CHIEFFI AND KIRK ON 162 MIDDLE-AGED AND OLD INDIVIDUALS AND 26 YOUNGER CONTROL SUBJECTS REVEALED SOME TENDENCY FOR TOCOPHEROL PLASMA VALUES TO INCREASE WITH AGE IN MEN BUT NOT IN WOMEN.

SINCE the recent introduction of accurate and convenient methods for plasma tocopherol determination, several studies on the blood level of this vitamin in young, normal subjects have been reported. Thus Wechsler, Mayer, and Sobotka (7) found an average plasma concentration of 0.96 mg. per cent in 12 subjects ranging in age from 23 to 30 years, and Quaife and Harris (5) reported an average value of 1.20 ± 0.22 mg. per cent in 13 individuals of a similar age group. A larger group comprising 70 young individuals was studied by Harris, Hickman, Jensen, and Spies (1), who reported a mean plasma concentration of 1.04 ± 0.32 mg. per cent.

Lemley, Gale, Furman, Cherrington, Darby, and Meneely (3) in a group of 104 unselected hospital patients between 15 and 88 years of age found an average plasma tocopherol content of 0.94 mg. per cent and observed a moderate increase in the concentration with age (coefficient of correlation age/tocopherol +0.34).

As most of the studies reported so far on normal tocopherol plasma levels have dealt mainly with younger subjects, the present investigation was undertaken with the purpose of establishing the concentration of plasma tocopherol in a larger number of middle-aged and old individuals.

EXPERIMENTAL

The study comprised 162 individuals (66 men and 96 women) between the ages of 40 and 101 years. For comparison 26 younger subjects (12 men and 14 women) were included in the investigation. The majority of the older subjects were inmates of the St. Louis City Infirmary and City Infirmary Hospital, whereas the younger subjects were private volunteers.

The investigation was undertaken during the months from July to October, 1949. The diet for this period was calculated to contain an average of 2,150 calories, 265 Gm. of carbohydrate, 110 Gm. of protein, and 69 Gm. of fat daily. Direct determinations of the tocopherol content were made on 24-hour samples of the prepared food. The samples were homogenized in a Waring blendor, and after extraction and saponification analyzed according to Quaife and Biehler (4). The average daily tocopherol content of the food was found to be 39 mg., an amount of vitamin E, which, according to the studies by Quaife, Swanson, Dju, and Harris (6), may be considered adequate. The caloric value and vitamin content of the diets of the younger subjects were not evaluated.

The tocopherol content of the plasma was determined by the procedure of Quaife and Biehler (4) using a Coleman No. 14 spectrophotometer. The standard curve for the analyses was constructed according to the directions given by Kjølhede (2). The average error of the method in analysis of 10 samples of the same blood was 1.8 per cent.

RESULTS

Table 1 contains the summarized values for the age groups 16 to 39, 40 to 59, 60 to 69, 70 to 79, and 80 to 101 years, and the values for men and women separately. The mean tocopherol plasma value for the 188 individuals

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Dr. Kirk is Associate Professor of Medicine and Director of Research, Division of Gerontology, Washington University School of Medicine. He received his M.D. degree in 1929 from the University of Copenhagen and was certified as a specialist in internal medicine (1938) and clinical pathology (1948). From 1931 to 1934 Dr. Kirk was assistant resident physician at the Rockefeller Institute. From 1936 to 1939 he was on the staff of the medical university clinic and director of the City Laboratories, Copenhagen. From 1939 to 1947 he was chief physician at the medical service, Holstebro County Hospital, Denmark.

His primary fields of research have been in clinical medicine and biochemistry. He is a member of the American and Danish Gerontological Societies and the Danish Society of Internal Medicine, a member of the Harvey Society, and a Fellow of the Royal Society of Medicine, England.

examined was 0.98 mg. per cent (s.d. 0.30 mg. per cent), 0.92 mg. per cent for the men and 1.01 mg. per cent for the women. The difference between the average values for the men and the women is not statistically significant.

It will be seen from the table that the mean tocopherol plasma concentration in the men tends to increase slightly with age (coefficient of correlation age/tocopherol +0.28, t-test of significance 2.5 for N = 78). For the group as a whole and for the women the coefficients are not significant (+0.15 and +0.06, respectively).

Summary

An investigation was made of the plasma tocopherol concentration in 162 middle-aged and old individuals offered a diet adequate in vitamin E and in 26 younger subjects. The mean plasma tocopherol level was 0.98 mg. per cent (s.d. 0.30 mg. per cent). There was noted some tendency for the tocopherol values to increase with age in the men but not in the women.

From the Division of Gerontology, Washington University School of Medicine, and the St. Louis City Infirmary Hospital, St. Louis, Missouri.

Funds and material were provided through the courtesy of Hoffmann-LaRoche, Inc.

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TABLE 1. TOCOPHEROL CONCENTRATION OF PLASMA IN 188 INDIVIDUALS

Age Group	Sex	Number	Tocopherol in Plasma		s. d.[1]
			Mean mg. %	Range mg. %	
16—39	Men	12	0.84	0.57—1.08	0.16
	Women	14	0.96	0.59—1.38	0.22
	Total	26	0.90	0.57—1.38	0.19
40—59	Men	8	0.82	0.49—1.19	0.18
	Women	12	0.95	0.32—1.65	0.34
	Total	20	0.91	0.32—1.65	0.27
60—69	Men	20	0.90	0.56—1.83	0.33
	Women	15	1.01	0.55—1.31	0.30
	Total	35	0.95	0.55—1.83	0.32
70—79	Men	27	0.95	0.40—1.37	0.30
	Women	37	1.07	0.30—1.91	0.34
	Total	64	1.02	0.30—1.91	0.32
Above 80	Men	11	1.16	0.63—1.84	0.32
	Women	32	0.96	0.36—1.87	0.33
	Total	43	1.01	0.36—1.87	0.33
16—101	Men	78	0.92	0.40—1.84	0.27
	Women	110	1.01	0.30—1.91	0.32
	Total	188	0.98	0.30—1.91	0.30

[1] s. d.—Standard deviation of the mean.

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Nitrogen Balance Studies in Four Elderly Men

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PHILIP G. ACKERMANN

BY THE ADMINISTRATION OF 3 DIETS CONTAINING VARYING QUANTITIES OF PROTEIN TO 4 MEN, 69 TO 76 YEARS OLD, OVER A PERIOD OF SIX MONTHS, THE AUTHORS DETERMINED BY DAILY NITROGEN BALANCE TESTS THAT DIETS BELOW .7 GM. PER KILOGRAM OF BODY WEIGHT RESULTED IN EXCESS NITROGEN LOSS, THAT DIETS CONTAINING .7 GM. RESULTED IN SLOW AND INCOMPLETE RECOVERY FROM NITROGEN DEPLETION, AND SUGGEST THAT THE MINIMAL REQUIREMENT FOR ELDERLY PEOPLE SHOULD BE 1.4 GM. OF PROTEIN PER KILOGRAM OF WEIGHT PER DAY. THIS PAPER WAS PRESENTED AT THE SECOND ANNUAL SCIENTIFIC MEETING OF THE GERONTOLOGICAL SOCIETY IN CHICAGO, NOVEMBER 5-6, 1949.

THE minimum amount of protein required to maintain nitrogen balance and sustain body weight in healthy young adults on a mixed diet has been found to be approximately .5 Gm. per kilogram of body weight per day (3, 6, 16). On this basis, the National Research Council (13) has recommended a protein intake of 1 Gm. per kilogram of body weight per day for the diet of the healthy young adult. It is about twice the amount necessary to maintain nitrogen equilibrium and provides an adequate margin of safety against nitrogen loss.

In view of the reduction in active tissues and cellular functions during the later decades of life, a diet containing 1 Gm. of protein per kilogram of body weight would seem to offer a rather generous supply of protein and a proper protection against body waste (1, 12, 17, 18).

The unstated premise of this argument would be that the old individual can maintain nitrogen equilibrium and body weight equally as well as the young adult on a diet containing only about .5 Gm. of protein per kilogram of body weight per day. Only then would it be safe to conclude that 1 Gm. of protein offers for the elderly individuals as adequate a protection from nitrogen loss as the same diet does in young people.

Unfortunately, nitrogen balance studies conducted in old people have not been designed to test the validity of this point. It would seem from the literature that the aim of such studies was rather a different one since the protein offered in the diets greatly exceeded .5 Gm. per kilogram of weight (4, 9). Also, our own work previously published (10) did not test this point, although it indicated that in some elderly people 1 Gm. of protein was not sufficient.

A closer approach to the subject was reported in a more recent study by Roberts, Kerr, and Ohlson (15). The authors found that nitrogen equilibrium was possible in 7 out of 8 vigorous old women, 52 to 74 years old, at intakes of .7 to 1.0 Gm. of protein per kilogram of weight. This study, however, was not a continuous one, and variations of nitrogen gains and losses were observed on several occasions whenever a three to five weeks' dietary routine was followed by 2 five day test periods.

It has been our experience that the maintenance of the calculated protein intake level for any great length of time is a difficult problem. Not only will a patient not always eat the total of his calculated diet but also the protein content of the food, particularly on a mixed diet, is subject to variations. It was pointed out by Leitch (11) and it also has been our own observations throughout the many years we have worked on this subject that the length of time required for the metabolism to adjust to varied protein intake levels has been underestimated, particularly in elderly people, and this has led to errors in the determinations of the nitrogen balance. Unless this factor can

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be controlled reliable results from nitrogen balance studies cannot be obtained.

Therefore, a continuous study in old people over an extended period of time with a diet of low protein content and control of the protein intake level seemed indicated in order to obtain true information as to the dietary needs in the aged.

Material and Method

Four inmates of the St. Louis City Infirmary Hospital were selected for study. A resumé of their case histories and the laboratory findings obtained prior to the observation period are given below.

Patient No. 1, C. M., was 76 years old at the time of the beginning of the investigation. Little is known of his family history except that his older brother had epilepsy in later life and died because of a fall during an attack. The patient worked as a street-car motorman until he was badly injured in an accident in 1940 and has not worked since then. He has had attacks of epilepsy since the accident; he was admitted to the City Hospital in 1947 with a diagnosis of angina pectoris and was later transferred to the City Infirmary Hospital.

Physical examination: The patient was co-operative; he was well nourished, and had a somewhat obese abdomen. The pupils reacted to light and accommodation and the conjunctivae were normal. The teeth were in good condition but some gingivitis was present. Examination of the neck revealed nothing abnormal. No rales were heard over the lungs. The heart was slightly enlarged to the left; no murmurs were present. The heart rate was regular except for occasional extrasystoles. B. P. 180/80. No masses were felt in the abdomen.

Laboratory observations: Red blood cells 4.5 million per cubic millimeter, white blood cells 8600 per cubic millimeter, differential count normal. Hemoglobin 12.8 Gm. per cent. Kahn test negative. N. P. N. 20 mg. per cent. Plasma total protein 6.8 Gm. per cent, albumin 4.5 Gm. per cent, globulin 2.3 Gm. per cent. Glucose tolerance test: fasting blood sugar 73 mg. per cent, after thirty minutes 110 mg. per cent, one hour 118 mg. per cent, two hours 143 mg. per cent, three hours 110 mg. per cent. The urine contained no albumin or sugar. B. M. R. —11 per cent.

Patient No. 2, F. K., was 72 years old at the time of the beginning of the investigation. He had worked as a blacksmith, peddler of apples, and janitor; after his leg was broken in an accident he had been unable to work. He had had asthma since early childhood and a chancre at the age of 30. Apart from this his health had on the whole been good. He was a moderate drinker.

Physical examination: The patient was co-operative. He was poorly nourished. The pupils reacted to light and accommodation. The mouth was edentulous. Examination of the neck revealed nothing abnormal. The chest had an enlarged antero-posterior diameter; the rib cage was fixed and the breathing took place chiefly by means of the accessory muscles. The percussion tone over the lungs was hyperresonant; no rales or ronchi were heard on auscultation. The heart outline was difficult to determine. There were no murmurs and the pulse rate was regular.

B. P. 156/94. The abdomen showed a scar after a right herniorrhaphy; there were no signs of ascites. The extremities revealed slight thickening of the arteries.

Laboratory observations: Red blood cells 4.5 million per cubic millimeter, white blood cells 12,300 per cubic millimeter, differential count normal. Hemoglobin 14.4 Gm. per cent. Kahn test negative. N. P. N. 27 mg. per cent. Plasma total protein 7.6 Gm. per cent, albumin 4.2 Gm. per cent, globulin 3.4 per cent. Glucose tolerance test: fasting blood sugar 73 mg. per cent, after thirty minutes 129 mg. per cent, one hour 150 mg. per cent, two hours 139 mg. per cent, three hours 107 mg. per cent. The urine contained no albumin or sugar. B. M. R. —32 per cent.

Patient No. 3, W. K., was 69 years old at the time of the beginning of the investigation. He had had no serious illness in childhood. In 1945 he was admitted to the City Hospital because of mental depression and psychiatric symptoms and was later transferred to the City Infirmary.

Physical examination: The patient was co-operative, but the mental state was somewhat dull. He was in a good state of nutrition. The pupils reacted to light and accommodation. Moderate arcus senilis was present. The mouth was edentulous. Examination of the neck revealed nothing abnormal. The lungs were clear to percussion and auscultation. The area of cardiac dullness was not increased; the heart sounds were normal and the rate regular. B. P. 175/85. Examination of the abdomen showed nothing abnormal. There were some varicosities on the left leg but no ulcerations. The reflexes were normal.

Laboratory observations: Red blood cells 4.5 million per cubic millimeter, white blood cells 10,300 per cubic millimeter, differential count normal. Hemoglobin 15.4 Gm. per cent. Kahn test negative. N. P. N. 20 mg. per cent. Plasma total protein 6.6 Gm. per cent, albumin 4.3 Gm. per cent, globulin 2.3 Gm. per cent. Glucose tolreance test: fasting blood sugar 76 mg. per cent, after thirty minutes 121 mg. per cent, one hour 123 mg. per cent, two hours 121 mg. per cent, three hours 86 mg. per cent. The urine contained no albumin or sugar. B. M. R. —8 per cent.

Patient No. 4, H. T., who was 75 years old at the time of the beginning of the investigation, had always been in good health. In 1942 at the age of 68 he developed arteriosclerotic gangrene of the left foot and in January, 1943, a left supra-condylar amputation was performed. He was readmitted to the City Hospital in March, 1943, for cerebral thrombosis, and after recovering to some extent was again discharged. After an accident in which he fell on his left side and injured his shoulder, the left median nerve was paralyzed. Since his admission to the City Infirmary Hospital in August, 1943, his condition had improved and he was getting along well.

Physical examination: The patient was co-operative and in a satisfactory state of nutrition. The pupils reacted to light and accommodation; a bilateral arcus senilis was present. The mouth was edentulous. Examination of the neck revealed nothing abnormal. The lungs were clear to percussion and auscultation. The area of cardiac dullness was not increased; the heart sounds were normal and the rate regular. B. P. 152/88. There was some thickening of the radial arteries. Examination of the abdomen showed nothing abnormal. There was evidence of slight residual paralysis of the left median nerve. The left leg was amputated above the knee; the right leg was essentially normal. Joint movements were free, and the patient was able to walk around without difficulty by the use of crutches.

Laboratory observations: Red blood cells 4.9 million per cubic millimeter, white blood cells 7,800 per cubic millimeter, differential count normal. Hemoglobin 13.7 Gm. per cent. Kahn test negative. N. P. N. 27 mg. per cent. Plasma total protein 7.2 Gm. per cent, albumin 4.6 Gm. per cent, globulin 2.6 Gm. per cent. Glucose tolerance test: fasting blood sugar 89 mg. per cent, after thirty minutes 191 mg. per cent, one hour 244 mg. per cent, two hours 119 mg. per cent, three hours 143 mg. per cent. The urine contained no albumin or sugar. B. M. R. —12 per cent.

In the selection of patients for this study we wished to avoid those having any great disturbance in their metabolic functions. For this reason oral glucose tolerance tests were run, as well as a B. M. R. It will be noted that 3 of the 4 patients selected have tolerance curves close to the normal, while one shows a curve of the mild diabetic type, without having any other evidences of disturbed carbohydrate metabolism. Similarly, while the B. M. R.'s of all the subjects were negative, only one showed any great variation from the normal. These differences in 2 of the subjects were not greater than we have found in other "normal" elderly patients in the Hospital and were not deemed sufficient in themselves to reject the patient for study.

Nitrogen balances were initially determined in the 4 patients during a five day period while they were eating the regular hospital diet ad libitum. In this period Patients No. 1 and No. 2 were found to be in negative balance.

Their protein intake calculated per kilogram of body weight averaged 1.3 and 1.4 Gm. per day. Patient No. 3 was in equilibrium with 1.1 Gm. of protein and patient No. 4 was found to be in positive balance on a protein intake of 1.4 Gm. per kilogram of body weight. The total calories consumed were approximately 2000. Some months later this study was begun with the restricted protein intake levels.

Dietary Procedure

Three different diets were offered to the patients in successive periods.

Diet	Grams Protein per Kg. of Body Weight	Percentage of Total Calories			No. of Days on Diet
		Protein	Fat	Carbohydrate	
No. 1	.5	6.6	43.3	54	60
No. 2	.34	5.4	49.6	45	15
No. 3	.7	7.9	44.1	48	110

Each diet of a given protein level consisted of 6 different daily menus. To avoid monotony the order in which the menus were offered was varied from week to week. At a given protein level the menus differed among themselves only in the use of different vegetables (e.g., green beans instead of peas, carrots instead of beets, or rice instead of potatoes), different desserts, or different meats. The relative amounts of each type of food was kept fairly constant and the total protein content adjusted close to the desired value. Since the nitrogen equilibrium may be influenced by changes in the caloric intake, care was taken to make the menus for all diets as iso-caloric as possible. There were small differences between the various menus but in all except a few instances (one or two periods during the entire test for each patient) the average calculated caloric intake for each patient was constant to within 5 per cent. This difference is hardly greater than the errors inherent in any method of computing the caloric value of the food from tables such as were used.

Representative Basic Menu for Each Diet

Diet No. 1

	Protein	Fat	Carbohydrate
Breakfast:			
100 cc. orange juice	.6	.1	12.9
100 Gm. Farina	1.6	.1	22.6
40 Gm. bread	3.7	1.6	20.0
10 Gm. butter	.1	8.1	—
35 cc. cream	.6	10.6	1.0
10 Gm. jelly	—	—	6.5
15 Gm. sugar	—	—	15.0
Black coffee	—	—	—
	6.6	20.5	78.0
Lunch:			
30 Gm. pork	6.1	1.6	—
100 Gm. potato	2.0	.1	19.1
100 Gm. applesauce	.2	.2	10.9
50 Gm. string beans	.9	—	1.6
20 Gm. bread	1.8	.8	10.0
30 cc. cream	.6	10.6	1.0
15 Gm. sugar	—	—	15.0
30 Gm. butter	.3	24.3	—
5 Gm. hard candy	—	—	5.0
	11.9	37.6	62.6
Supper:			
30 Gm. liver	4.6	2.0	—
100 Gm. rice	2.3	.8	22.5
80 Gm. cooked celery, mashed	1.0	.2	2.4
50 Gm. carrots	.6	.2	4.7
20 Gm. bread	1.8	.8	10.0
30 cc. cream	.6	10.6	1.0
30 Gm. butter	.3	24.3	—
10 Gm. sugar	—	—	10.0
100 Gm. jello	1.2	—	15.1
	12.4	38.9	65.7
Total	30.9	97.0	206.3
Total Calories 1820			

The total calories required were calculated from the oxygen consumption at the basal state of the patients and care was taken that they were maintained for each of the test diets. Patients No. 1 and No. 3 received an excess over the twenty-four calorie output of 45 per cent, which amounted to about 2000 calories a day. Patients No. 2 and No. 4, whose oxygen

REPRESENTATIVE BASIC MENU FOR EACH DIET—Cont.

Diet No. 2

	Protein	Fat	Carbohydrate
BREAKFAST:			
100 cc. tomato juice	1.0	.2	4.3
30 Gm. bread, white	2.9	1.2	15.0
10 Gm. butter	.1	8.1	—
30 cc. cream	.6	10.6	1.0
10 Gm. jelly	—	—	6.5
15 Gm. sugar	—	—	15.0
80 Gm. Ralston	2.6	.2	18.9
Black coffee	—	—	—
	7.2	20.3	60.7
LUNCH:			
20 Gm. bacon	.9	21.0	—
100 Gm. sweet potato	1.8	.8	28.0
50 Gm. cauliflower	1.2	.1	2.5
20 Gm. bread	2.0	.8	10.0
30 cc. cream	.6	10.6	1.0
20 Gm. butter	—	23.0	—
10 Gm. sugar	—	—	10.0
	6.5	56.3	51.5
SUPPER:			
20 Gm. bread	2.0	.8	10.0
100 Gm. potato	2.0	.1	19.1
30 Gm. butter	.3	24.3	—
50 Gm. corn, canned	1.3	.5	9.8
15 cc. cream	.3	5.3	.5
10 Gm. sugar	—	—	10.0
100 Gm. prunes, stewed 4-5 medium, 2 tbs. juice	1.1	.3	40.5
50 Gm. raw cabbage slaw	.7	.1	2.7
	7.7	31.4	92.6
Total Total Calories 1877	21.4	108.0	204.8

consumptions were quite low, received 115 and 61 per cent, respectively, above their basal requirements in order to avoid a diet containing less than 1800 calories (see table 2).

During the whole time the patients were on study they were under the impression that their food was superior to the usual hospital food, a point we would like to emphasize because of the excellent cooperation we received from the patients without which a study could not be successful because of certain mental changes, to be discussed later, which otherwise might have been misinterpreted as dissatisfaction with unattractive food.

In order to maintain the nitrogen at the calculated intake levels it was desirable that the estimated protein of the diet should approximate the protein analytically determined. Therefore, all the foods used which contained an appreciable amount of protein were analyzed in our laboratory and the amounts calculated from the analyses. Swift and Company's

REPRESENTATIVE BASIC MENU FOR EACH DIET—Cont.

Diet No. 3

	Protein	Fat	Carbohydrate
BREAKFAST:			
100 cc. grapefruit juice	.5	.2	13.5
40 Gm. bread	3.9	1.6	20.0
10 Gm. butter	.1	8.1	—
15 cc. cream	.3	5.3	.5
10 Gm. jelly	—	—	6.5
15 Gm. sugar	—	—	15.0
100 Gm. Farina	1.6	.1	22.6
100 cc. milk	3.1	4.5	5.5
Black coffee	—	—	—
	9.5	19.8	83.6
LUNCH:			
40 Gm. beef	8.2	2.4	—
100 Gm. potato	2.1	.2	19.0
100 Gm. applesauce	.2	.2	10.9
20 Gm. bread	2.0	.8	10.0
10 Gm. sugar	—	—	10.0
15 cc. cream	.3	5.3	.5
20 Gm. butter	.2	16.2	—
75 Gm. ice cream	3.0	10.2	21.0
	16.0	35.3	71.4
SUPPER:			
20 Gm. butter	.2	16.2	—
1 soft boiled egg	6.7	5.8	.4
80 Gm. potato	1.8	.2	16.2
10 Gm. onions	.2	—	—
20 Gm. bread	2.0	.8	10.0
15 cc. cream	.3	5.3	.5
50 Gm. cabbage	.7	.1	2.7
15 Gm. sugar	—	—	15.0
100 Gm. plums in syrup	.4	.2	28.4
	12.3	28.6	73.2
Total Total Calories 1817	37.8	83.7	228.2

Junior Meats, which were found to be very constant in protein content were used. Since homogenized milk was used to adjust the diets, it was analyzed at regular intervals, but very little variation was found in the protein content. Vegetables, especially potatoes, rice, and peas were steamed with a measured amount of water and timed while boiling, minimizing the differences in the state of hydration of such vegetables that otherwise vary a great deal in their protein content. The samples taken for analysis were treated exactly like those fed to the patients. By means of these precautions we were able to reduce the difference between the protein calculated in the diet offered the patients and that found by analysis to 1 Gm. or less for each day's diet.

Since each patient's weight differed (from 56 to 71 kg.) at the beginning of the tests, the diets were adjusted to the exact protein requirement either by adding homogenized milk to make up for a deficit or by withholding food if it contained a surplus of protein. The patients were weighed at the end of each five day period and their exact protein requirements for the next period were calculated from these weights. The food withheld from a particular patient was collected with the food left by him. When food was refused by a patient it was weighed before placing in the collection jar, its protein content estimated from previous analytic data, and the protein deficit made up by giving the patient additional milk. Although the patients would occasionally not eat all the food offered, the additional milk was readily taken.

For the determination of the nitrogen balance the fool left was analyzed, but for the purposes of adjusting the protein intake, the calculated protein content was used. This enabled us to make the adjustments on the same day, and in most cases immediately following the same meal that the food was left. The daily intake was thus much more constant than it would have been if the adjustments had been made the following day after the results of the actual analysis were available. Any small differences between the calculated and analyzed values for the foods left were usually much less than the unavoidable day to day variations of the total food. At the same time that the foods were weighed out for the patients' meals, exactly similar samples were weighed out for analysis and the samples for a whole day's menu pooled.

Chemical Procedure

The daily foods offered, the foods refused or withheld, and the stools were collected in separate bottles containing about 50 ml. of 5N sulfuric acid to prevent loss of nitrogen. The food offered was analyzed separately each day, but the foods refused and the stools were pooled for analysis for each five day period. The samples were ground in a Waring Blender with the addition of further water if necessary. To the ground material about two-fifths its volume of concentrated sulfuric acid was added slowly. This follows the procedure of Peters and Van Slyke (14) except that the treatment in the Blender makes the preliminary digestion much more rapid. The samples were then allowed to cool, made up to a definite volume, mixed well, and aliquots taken for analysis. Because of the viscous character of the strongly acid solution, pipettes calibrated to contain were used and were afterwards rinsed with distilled water.

The urines were also collected in about 50 ml. of 5N sulfuric acid and aliquots of the pooled twenty-four-hour specimens taken for analysis.

All nitrogen analyses were performed in duplicate by a semi-micro method following the suggestions of Kirk (7, 8). Aliquots containing about 20 mg. of nitrogen were digested in 100 ml. Kjeldahl flasks using mercury and selenium as catalysts. The ammonia was steam distilled into boric acid solution and titrated with N/10 sulfuric acid using bromcresol green-methyl red mixed indicator. Carbohydrates and fats contained in the diets were estimated with the aid of the tables of Bowes and Church (2).

Results

Figures 1 to 4 give a detailed account of the entire six months' study of nitrogen balances with the 3 different diets. The results of each test period were summarized for five days except where noted, since the stools and the foods left were usually pooled for that time. The uppermost section of each figure gives the weight in kilograms of the patient at the end of each test period. In the next, and largest, section of each figure are plotted in terms of total protein (N x 6.25) for each test period the amount excreted in the urine (dashed line), the amount absorbed (solid line), and the amount found in the stool. The amount absorbed is calculated as the amount of protein consumed minus that found in the stool. When the nitrogen excreted in the urine exceeded that absorbed the patient was in negative nitrogen balance as indicated by the unshaded area between the two lines on the left in this section. When the amount absorbed exceeded that excreted, the patient was in positive nitrogen balance as indicated by the shaded area between the two lines on the right.

Also plotted in each figure are the total amount of creatinine excreted for each five day test period and the average intake of protein in grams per kilogram of body weight. In those instances noted in the figures in which

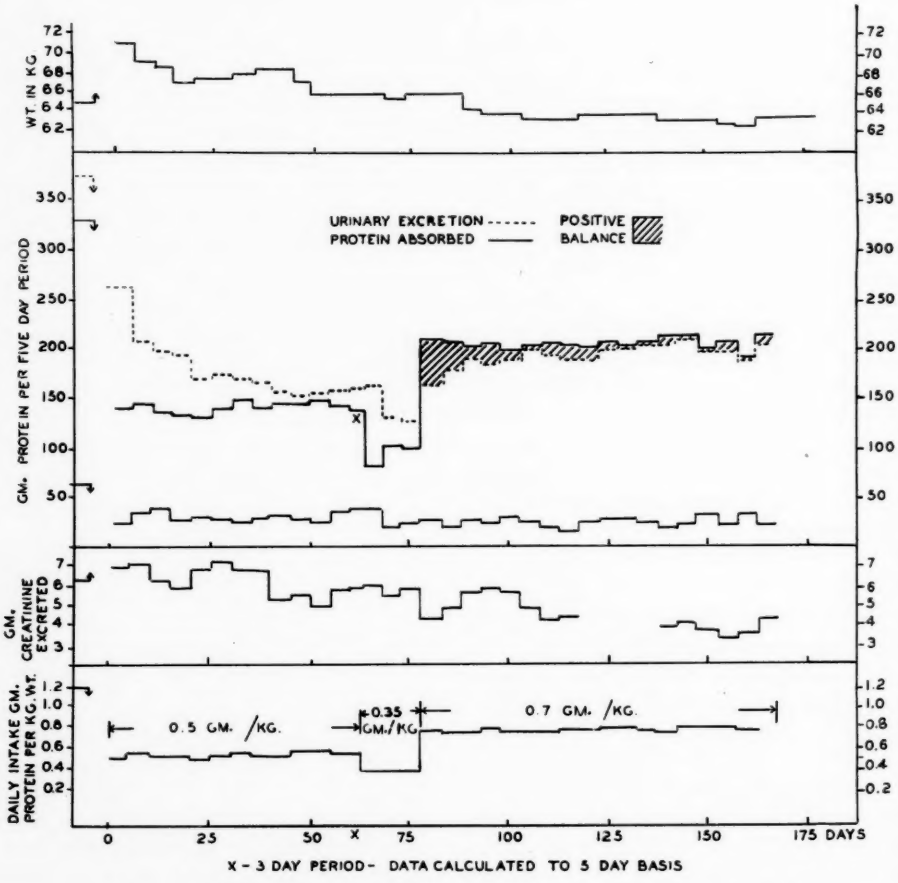

Fig. 1. Balance studies on patient No. 1 (C. M.). For explanation see text.

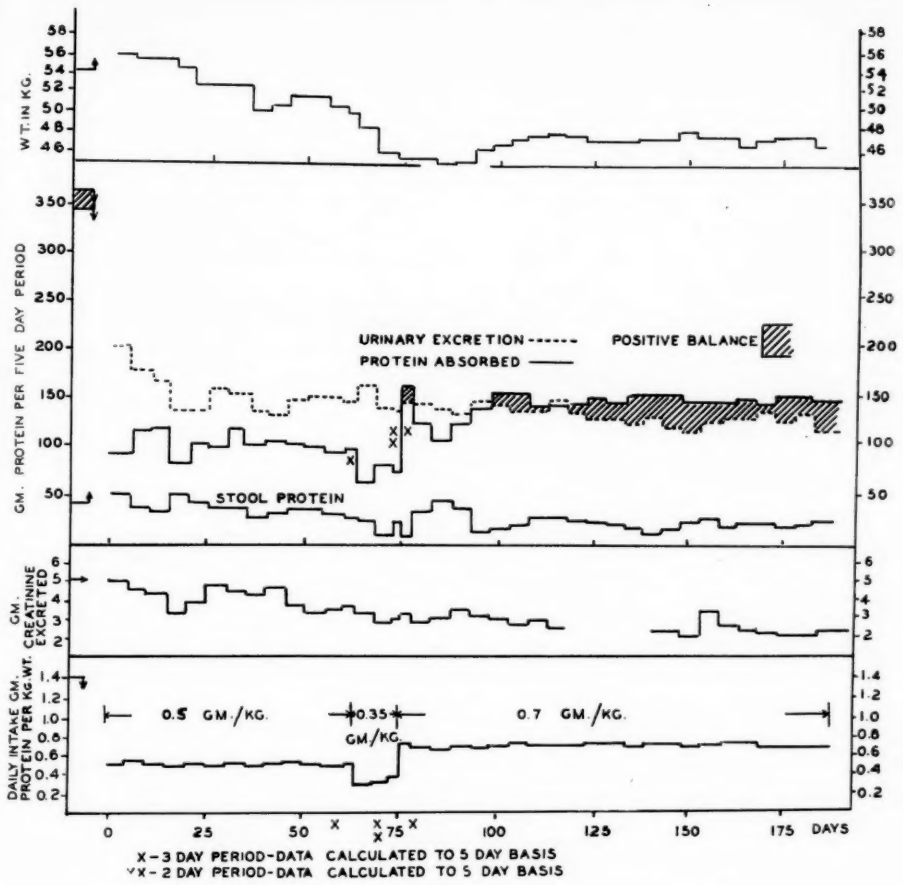

FIG. 2. Balance studies on patient No. 2 (F. K.). For explanation see text.

the test periods were other than five days, the results have been calculated to a five day basis to make them readily comparable with the rest of the data. At the extreme left in each figure is plotted the data obtained from the earlier single period nitrogen balance study on the patient. The common abscissa for all the charts is the time in days from the beginning of the test. The continuous nitrogen balance study was begun on February 3, 1949, and continued to August 9, 1949.

From the start of diet No. 1 (.5 Gm. protein per kg. of weight) negative nitrogen balance prevailed in all the subjects. With the exception of patient No. 2, some tendency of adjustment to the lowered protein intake level could be noted after about thirty days, and the degree of nitrogen loss became gradually less. Patient No. 2 remained in extreme negative balance throughout the sixty days while on diet No. 1. The best adjustment to the low protein diet was found in patient No. 4, who was in positive balance when tested six months earlier, and in patient No. 3, who was then in equilibrium.

After sixty days the protein intake level for each patient was reduced to .34 Gm. per kilogram of body weight for the next fifteen

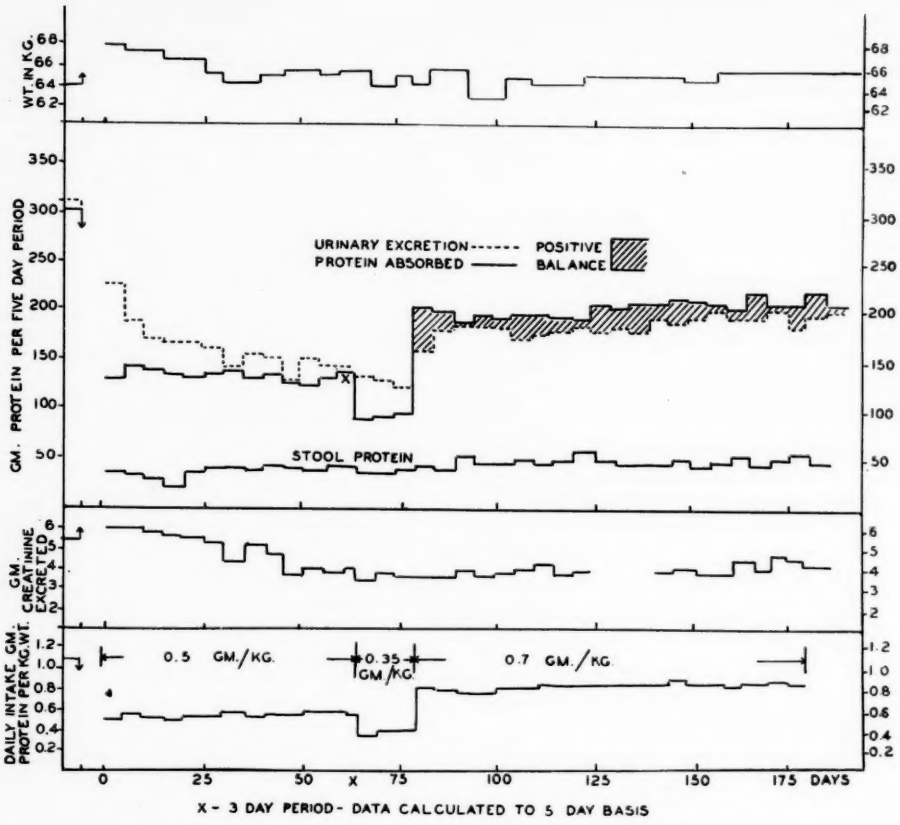
WT. IN KG.
GM. PROTEIN PER FIVE DAY PERIOD
URINARY EXCRETION------ POSITIVE
PROTEIN ABSORBED —— BALANCE
STOOL PROTEIN
GM. CREATININE EXCRETED
DAILY INTAKE, GM. PROTEIN PER KG. WT.
0.5 GM./KG.
0.35 GM./KG.
0.7 GM./KG.
0 25 50 X 75 100 125 150 175 DAYS
X - 3 DAY PERIOD - DATA CALCULATED TO 5 DAY BASIS

FIG. 3. Balance studies on patient No. 3 (W. K.). For explanation see text.

days. As could be expected, the nitrogen balances became more negative again, particularly during the first five days, and to some degree less negative the following ten days. Table 1 gives the sum of the total nitrogen losses for the first sixty and the following fifteen days. During the seventy-five day period nitrogen losses totaled from 71 to 135 Gm. By the use of the conversion figure of 6.25 it would amount to 444 to 848 Gm. of protein. Assuming a 15 per cent protein content in the muscle of elderly individuals, it could be estimated that about 3 to 5.5 kg. of muscle tissue were lost. The actual weight loss during that period was only 1 kg. in patient No. 4, but 10.5 kg. in patient No. 2. Obviously other factors like water retention in patient No. 4 or fat loss in patient No. 2 must be responsible for the difference. The other 2 patients had lost 3 and 5 kg.

These individuals were in a state of protein depletion at the end of the seventy-five days, at which time clinical changes became noticeable. Patient No. 1 developed an infection on his hand originating from a small scratch. Patient No. 3 had a thrombophlebitis in a varicose vein of his leg, was treated with penicillin, and responded with complete recovery within five days. Patient No. 2 was treated for bronchitis with penicillin. He had lost his appetite, had become mentally confused and withdrawn, objected to his daily walks, and was irritable.

Patient No. 4 showed the least untoward effect but he, too, was more irritable and mentally depressed.

At the time when the mental and physical state was low and the protein depletion had reached a maximum, the meals were served in an especially attractive manner. As mentioned previously, the meals looked and tasted good. They were offered foods they had not had for years, such as fresh strawberries, whipped cream, bacon, and even an occasional glass of beer. The mental symptoms were by no means caused by dissatisfaction. The patients thought their diets were excellent and yet one lost his appetite and the other 3, who never left anything on their trays, forced themselves to eat at times.

The physical and mental condition of these patients made it imperative to increase the protein intake without further delay. Diet No. 3 offering .7 Gm. of protein per kilogram of body weight per day was introduced. The effect was a slight positive nitrogen balance after the expected initial lag of nitrogen excretion that lasted from five to ten days. Patient No. 2 remained for another twenty days in negative balance before he, too, started to retain nitrogen. The total amount of nitrogen retained was not very large. After eighty-five days on diet No. 3 patient No. 1 developed a ruptured diverticulum of the colon and had to be transferred to a surgical service, recovering without any further treatment within two weeks.

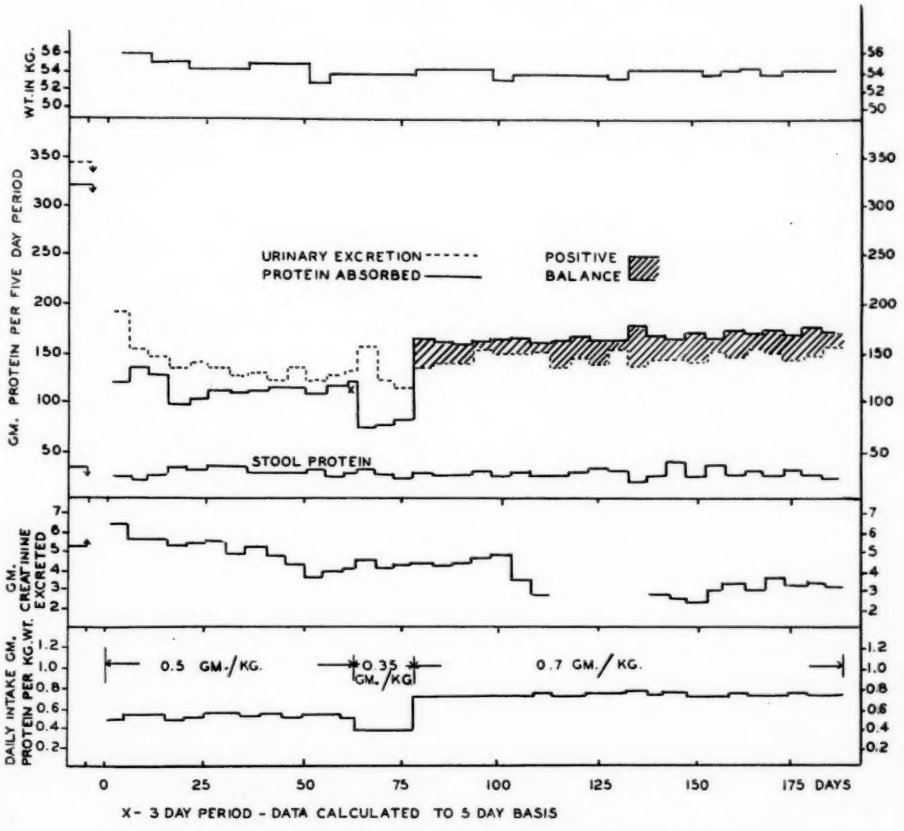
WT. IN KG.
GM. PROTEIN PER FIVE DAY PERIOD
URINARY EXCRETION
PROTEIN ABSORBED
POSITIVE BALANCE
STOOL PROTEIN
GM. CREATININE EXCRETED
DAILY INTAKE GM. PROTEIN PER KG. WT.
0.5 GM./KG.
0.35 GM./KG.
0.7 GM./KG.
0 25 50 75 100 125 150 175 DAYS
X- 3 DAY PERIOD - DATA CALCULATED TO 5 DAY BASIS

FIG. 4. Balance studies on patient No. 4 (H. T.). For explanation see text.

At this time, that is 85 days after the beginning of the .7 Gm. of protein diet, patient No. 1 and No. 2 were still considerably in nitrogen deficit (71 and 100 Gm., respectively). Patients No. 3 and No. 4 had recovered all but 25 and 12 Gm., respectively, of their previous nitrogen loss. After 110 days on diet No. 3 patient No. 4 had completely recovered all the nitrogen previously lost, while patient No. 3 was still in a slight over-all nitrogen deficit, and patient No. 2 showed a net loss of 85 Gm. for the whole period at that time (see table 1).

Clinically the subjects showed improvement, became more cheerful, including patient No. 2, who was almost stuperous a few weeks previous to the feeding of the diet containing .7 Gm. of protein. All the patients also showed a great improvement in their appetites and mental and physical vigor.

No recovery from the weight loss suffered during the low protein diets of .5 and .3 Gm. could be noted in 3 of the patients. Only patient No. 2 recovered 1.5 kg. of the 10.5 he had lost while on diet No. 1 and 2 after eighty-five days on the .7 Gm. diet. At the end of 110 days on diet No. 3 no further increase in weight was observed. Patient No. 1 had even lost an additional 3 kg. after eighty-five days on diet No. 3. This was partly due to his diverticulitis, for which reason, as mentioned previously, he had to be discontinued from the study. Patient No. 3 remained at his deficit of 3 kg., while patient No. 4, who had lost only 1 kg., continued to maintain his weight for the following 110 days on the .7 Gm. diet.

The oxygen consumption expressed as the twenty-four-hour calorie output at the basal state has been charted in table 2. The Sanborn waterless apparatus was used for the determinations. As may be noted from the table, patient No. 2 showed a great increase in his

TABLE 1. WEIGHT CHANGES AND NITROGEN LOSSES (−) AND RETENTIONS (+) OF EACH PATIENT ON THE 3 DIETS

		Patient No. 1		Patient No. 2		Patient No. 3		Patient No. 4	
		Body Weight Kg.	Nitrogen Balance in Gm.	Body Weight Kg.	Nitrogen Balance in Gm.	Body Weight Kg.	Nitrogen Balance in Gm.	Body Weight Kg.	Nitrogen Balance in Gm.
Before Beginning of Experiment		71	—	56	—	67.5	—	56	—
Diet No. 1	(.5 Gm. protein per Kg/wt.) after 60 days	66	−74.9	51	−97.8	64.5	−56.6	53.5	−46.0
Diet No. 2	(.34 Gm. protein per Kg/wt.) after 15 days	66	−22.4	45.5	−37.0	64.5	−18.5	55	−25.4
Summary of changes after 75 days		−5	−97.3	−10.5	−134.9	−3	−75.1	−1	−71.3
Diet No. 3	(.7 Gm. protein per Kg/wt.) after 85 days	63	+26.0	47	+35.2	64.5	+50.4	55	+59.0
	Residual deficit	−8	−71.3	−9	−99.6	−3	−24.7	−1	−12.3
	After 110 days	—	—	47	+49.4	64.5	+62.1	55	+72.5
	Residual deficit after 185 days	—	—	−9	−85.5	−3	−12.9	−1	+1.2

TABLE 2. TOTAL 24 HOUR CALORIE OUTPUT AT THE BASAL STATE

Patient	Number 1		Number 2		Number 3		Number 4	
Time in Relation to the Experiment	24 Hour Total Calories	Weight in Kg.	24 Hour Total Calories	Weight in Kg.	24 Hour Total Calories	Weight in Kg.	24 Hour Total Calories	Weight in Kg.
Before onset of Diet No. 1	1324	71	870	56	1360	67.5	1160	56
18 days on Diet No. 1	1255	67.5	1360	54.5	1340	66	1160	55
57 days on Diet No. 1	1285	66	1560	51	1420	64.5	1155	54
19 days on Diet No. 3	1390	66	1140	45	1420	65	1140	55.5
51 days on Diet No. 3	1170	63.5	1000	48	1440	64	1140	55

basal calorie output after eighteen and fifty-seven days on diet 1. Later, on diet No. 3, which offered .7 Gm. of protein, his oxygen consumption decreased again and his basal calorie output approached his initial basal calorie requirement at the beginning of the experiment. Patient No. 3 also showed an increase in his basal calorie output after fifty-seven days on the .5 Gm. protein diet. His increase in the total twenty-four-hour calorie output had been maintained throughout the time on diet No. 3. Patient No. 4 showed little change in his oxygen consumption.

DISCUSSION

At the start of the experiment these patients had been receiving an adequate amount of calories, half of which had been supplied by carbohydrates. This energy food value had been maintained for each of the diets used throughout the study. Three of the subjects showed little change in their oxygen consumption as the work progressed and their caloric intake remained adequate at all times. Patient No. 2, whose basal metabolic rate was —32 per cent at the beginning, was given a diet of 1800 calories. His twenty-four-hour caloric output at the basal state was only 870, but it increased to 1560 when he had received the .5 Gm. protein diet (see table 2). At this particular time his caloric intake cannot be considered adequate yet could not be increased since the patient had become a feeding problem. However, after diet No. 3 was started, supplying .7 Gm. of protein, after fifty-one days the patient's caloric output dropped to 1000 and with no calories added to his food he regained 2.5 kg. of the 10.5 kg. lost during the time he was on the protein depletion diets.

In these 4 patients the minimal protein required to maintain body weight and nitrogen balance was .7 Gm. per kilogram weight per day with the diet and caloric intake used. This is above the requirement of the young adult according to Sherman (16), Hegsted, Tsongas, Abbott, and Stare (6), and Bricker, Shively, Smith, Mitchell, and Hamilton (3) who recommended for the minimal protein requirement .55 Gm. per kilogram weight or less. Consequently, a diet containing 1 Gm. per kilogram of body weight, as has been suggested not only for the young but also the elderly, would provide the old with a smaller margin of safety against nitrogen loss than the young.

The response of the metabolism of old people to dietary changes is a sluggish one. We could observe that all these individuals, when given a .7 Gm. protein diet, although in positive nitrogen balance, were still in a state of great nitrogen deficit after eighty-five days, some even after 110 days. It is quite interesting to compare these results with those obtained by Bricker (3), who also found consistent positive nitrogen balances when her young subjects received their estimated protein requirement after a protein depletion period. In contrast to these old people her subjects after a ten week period on their requirement

diet had accumulated an excess of retained nitrogen, while our subjects after a much longer time were not able to even recover their deficit.

Because of the slow rate of adjustment of the protein metabolism in older people, previous nitrogen balance studies, allowing the usual three to five weeks' time for adjustment on the selected test diet, cannot be expected to give a true picture of the mechanism. Obviously the 2 patients whose nitrogen balances under such circumstances were found to be negative must have been previously eating a larger amount of protein than they had obtained at the time of testing when the foods were weighed to them and their free choice had become limited. The opposite must have been true with patient No. 4, who was in positive balance at this time.

Nitrogen depletion in old people is more serious than in young ones since it may start a vicious cycle. First, they may lose their appetites and with the decreased food intake become more depleted. This in turn is accompanied by a loss of weight and vigor, and their general health as well as their mental state is affected. In addition, it was found that those individuals on a relatively low protein diet had a slow rate of recovery. It is, therefore, our opinion that a diet of 1 Gm. of protein, which would provide a smaller margin of safety than for the young adult, cannot be considered an adequate diet. At least twice the minimal protein requirement, which would comprise 1.4 grams of protein per kilogram of weight per day is suggested.

Summary

In a continuous study over a period of six months on 4 men, 69 to 76 years old, daily nitrogen balances were determined. In 3 successive periods the nitrogen intake levels per kilogram of body weight were .5 Gm. for sixty days, .34 Gm. for fifteen days, and .7 Gm. for 110 days.

The diets below .7 Gm. per kilogram body weight resulted in excessive nitrogen loss in all the elderly individuals which was paralleled in 3 of them by a considerable loss of weight. During this time of nitrogen depletion, the individuals demonstrated mental depression and decreased resistance to infections.

With a diet of .7 Gm. of protein per kilogram body weight the recovery from the nitrogen depletion was slow and incomplete for the first eighty-five days in all 4 individuals. After 110 days only 1 had fully recovered from the nitrogen deficit acquired while they had been on the lower protein diets.

These observations have shown that .5 Gm. of protein per kilogram of body weight, which approximates the minimal requirement of the young adult, does not meet such a requirement in these old patients. Therefore, in analogy to the estimated adequate protein allowance for the young adult which is 1 Gm. of protein, it is suggested that these old individuals should receive twice the minimal requirement, which should be 1.4 Gm. of protein per kilogram of weight per day.

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Factors Related to the Adjustment of Retired Y. M. C. A. Secretaries

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IN AN EFFORT TO DETERMINE THE CORRELATES OF ADJUSTMENT FACTORS IN RETIREMENT, A GROUP OF RETIRED Y.M.C.A. SECRETARIES WERE STUDIED AND THE CONCLUSION WAS REACHED THAT AN ASSOCIATION BETWEEN SOME OF THE FACTORS AND THE QUALITY OF ADJUSTMENT EXISTS.

In recent years the attention of both laymen and scientists has been drawn to the problem of adjustment of older adults after retirement. This research concerning adjustment of secretaries retired from the Young Men's Christian Association is one of several studies currently being carried out by the Committee for the Study of Later Maturity, Committee on Human Development, the University of Chicago. Other retired professional groups included in this Committee's research program are teachers, ministers, and physicians.

One of the purposes of the present study (1) is to demonstrate the correlates of good and poor adjustment in retirement of our particular group of retired Y.M.C.A. secretaries. As an operational definition of adjustment we have used that of Cavan, Burgess, Havighurst, and Goldhamer:

> "Personal adjustment to ageing, or to other changes in one's self or one's environment, may be defined as the individual's restructuring of his attitudes and behavior in response to a new situation in such a way as to integrate the expression of his aspirations with the expectation and demands of society. This definition stresses the fact that adjustment represents an integrated reaction of the person as a member of society to a new situation (4)."

Procedure

Three-hundred twenty-eight retired Y.M.C.A. secretaries were selected from the total 1947 listing of members of the Association's Retirement Fund; this group included the total membership of four chapters of retired secretaries, organized geographically. To each of this group of 328 was mailed a preliminary schedule, "A Study of Retirement," and some time later the questionnaire, *Your Activities and Attitudes* (3), which is an inventory of activities and attitudes. The Attitudes Inventory includes sections on attitudes toward health, family, friends, leisure, work, economic security, religion, feelings of usefulness, and feelings of happiness.

The sum of these sectional scores provides a total attitude score; this composite score has been used as our criterion of adjustment. Our analysis here is based on the returns from the mailing of *Your Activities and Attitudes:* 161 or 49.7 per cent of the mailing.

Certain factual information concerning *each* man in the study population was obtained through cooperation of the office of the Y.M.C.A. Retirement Fund and through personal letters to nonrespondents. These data were utilized in chi-square comparisons of respondents and nonrespondents in order to discover if sample biases existed within our responding group (2). Certain biases were thus revealed: more of the responding group than expected by chance had served the Y.M.C.A. for twenty-five years or more, had retired at 60 years or older, had moved from their last station with the organization, and felt they were economically secure.

Our respondents seemed to represent men who had made work with the Association their life-long careers. The former Y.M.C.A. secretaries our sample does not represent were a deviating group who were associated with the organization less than twenty-five years who retired before the age of 60—former secretaries who, it may be said, did not give life-

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long service to the organization. It is important to note these facts when considering the correlates of good adjustment in this group.

Results

Table 1 shows coefficients of mean square contingency, corrected, correlating certain attributes with total attitude scores for the retired Y.M.C.A. secretaries. As seen in this table, the coefficients ranged from 0.09 to 0.72; the former is the estimate of the correlation between the number of friends of the opposite sex during the teens and the total attitude scores, while the latter is the C_{cor} value of scores on feelings of happiness cross-tabulated with the total attitude scores.

This score on feelings of happiness is a portion of the total attitude score with which it is correlated. When the coefficients correlating sectional attitude scores with the total attitude scores are excluded, the range of coefficients is from 0.09 to 0.47; in this case the latter is C_{cor} showing the relationship between a total score on the Activities Inventory and the total score on the Attitude Inventory.

Approximately two-thirds of the total number of coefficients of contingency ranged from 0.20 to 0.29. The scores in the 0.20's generally included items on family, friends, leisure, employment, and security. Six were below 0.20 and 10 were 0.30 and above; 3 of this latter group were above 0.40. As indicated in table 1, those below 0.20 included 3 of the items from the section of *Your Activities and Attitudes* entitled, "Your Earlier Life"; the other 3 were concerned with frequency of attending clubs, frequency of hearing from young friends, and the belief in an after life. Those of 0.30 or above included 3 coefficients concerning religion, 3 on health, 2 on economic and geographic mobility, 1 on security, and 1 on the composite activities score. For the most part, all of the relationships were low and positive.

Discussion

In interpreting these results it is necessary to point out the salient fact that because a relationship is found to exist between two characteristics it does not follow that the relationship is causal. Because a former Y.M.C.A. secretary indicated, for example, that his health was good does not mean that because he so rated his health he therefore will be well adjusted; such a correlation merely signifies that within our particular group the tendency was for the men rating their health as good or excellent to have the higher adjustment scores.

Let is be emphasized that, so far as we have demonstrated, these relationships existed within our group of 161 retired Y.M.C.A. secretaries only. Although this particular group did not seem statistically to represent our total study population, our group did seem to be representative of the retired secretaries with whom Y.M.C.A. work has been the life-long occupation. This bias makes it important to accentuate the fact that the associations indicated by our research may be said to exist within this special segment of our study population—those who returned the questionnaire, *Your Activities and Attitudes.*

One further consideration must be made: all of these 161 Y.M.C.A. men were in the upper half of the possible range of scores on

TABLE 1. COEFFICIENTS OF CONTINGENCY CORRELATING CERTAIN ATTRIBUTES WITH TOTAL ATTITUDE SCORES FOR 161 RETIRED Y. M. C. A. SECRETARIES.

Attribute	C_{cor}	Attribute	C_{cor}
Present age	0.20	*Employment*	
		Present employment status	0.29[1]
Health		Attitudes toward work	(0.56)[2]
Self-rating, present health	0.46[2]		
Number serious physical problems	0.42	*Economic Security*	
Number physical difficulties	0.21	Economic position	0.29[2]
Health score	0.27	Economic security	0.20
Activities health score	0.34[1]	Home ownership	0.20
Attitudes toward health	(0.62)[2]	Activities security score	0.36[1]
		Attitudes toward economic security	(0.41)[2]
Family			
Happiness in marriage score	0.27	*Religion*	
Family relationships score	0.22	Frequency of church attendance	0.32[1]
Attitudes toward family	(0.55)[2]	Frequency hear church services on radio	0.22
		Frequency reading Bible	0.38[2]
Friends		Belief in after life	0.19
Frequency of seeing friends	0.26	Activities, religious	0.39[1]
Number close friends	0.29	Attitudes toward religion	(0.44)[2]
Number friends among children	0.27[1]		
Frequency of hearing from children-friends	0.10	*Earlier Life*	
Activities intimate contacts	0.20	Feeling toward father	−0.11
Attitudes toward friends	(0.38)[2]	Feeling toward mother	0.26
		Number friends same sex, teens	0.11
Leisure		Number friends opposite sex, teens	0.09
Number leisure-time activities	0.26	Number friends opposite sex, early 20's	−0.23
Number hobbies	0.24		
Time reading	0.27[1]	*Mobility*	
Attitudes toward leisure	(0.66)[2]	Economic mobility	0.34
		Geographic mobility	−0.31
Organizations			
Number clubs active in	0.23	*Others*	
Frequency attending clubs	0.10	Attitudes toward usefulness	(0.48)[2]
Number offices	0.21	Attitudes toward happiness	(0.72)[2]
Activities leisure time	0.27	Total activities scores	0.47[2]

[1] Significant at the 5 or 2 per cent level.
[2] Significant at the 1 per cent level.

the Attitude Inventory. Further examination of the distribution reveals that over 90 per cent of the former secretaries were in the upper one-third of the total possible range and that almost two-fifths were in the upper sixth of the range. This is to say that almost all of our study group were average to well-adjusted, at least by our criterion of adjustment.

The great majority of our coefficients fell in the 0.20's. With one exception, viz., the relationship between number of friends of the opposite sex at the age of early twenties and the total attitute scores, these associations were all positive. Generally, items relating to family, friends, number of clubs and offices, leisure, work, and security had coefficients in the 0.20's. We would consider that these are indicative of a definite association in view of the fact that our criterion is a composite score, being made up of several sectional category scores on different, fairly independent areas of adjustment. The areas included in our hypotheses are areas of life which might likely be relevant to the personal adjustment of the older person in our culture today. These are the relationships whose existence we wished to demonstrate.

Nine coefficients were more than 0.30. Three

of these items dealt with participation in religious activities. Examination of original contingency tables shows that a great majority of the former secretaries were participants in church activities and that participation was an important factor in their adjustment.

Three of the higher group of coefficients were the associations between self-rating on health and adjustment scores, between serious physical problems and adjustment scores, and between a composite health score and adjustment scores. These were clearly positive relationships; the P values of the chi-square indicate that there are statistically significant differences in the total pattern so that these coefficients are probably reliable. Two coefficients of the higher group were on items related to economic security: a security score and a score on economic mobility. Thus matters of health and economic security were also important determinant factors in the favorable adjustment of retired Y.M.C.A. secretaries.

A descriptive analysis of the Y.M.C.A. group (1) has demonstrated that in comparison with other groups of individuals in later maturity, almost a stereotyped retired Y.M.C.A. secretary may be said to exist. This is true, of course, only in the sense of the ideal type (5), the hypothetic individual showing all of the "typical" characteristics of the retired "Y" secretary. He may realize that this is the person that society expects him to be, that society, by its subtle rewards and punishments, forces him to be. When appealed to participate in this study by one of the officers of the retired secretaries' organization he may have classified himself, consciously or unconsciously, much as he felt society expected him to be.

Perhaps to the extent that the retired Y.M.C.A. secretary conformed to this ideal type may be the key to his adjustment, as judged by our criterion. The extent to which he participated in activities which society feels are characteristic of retired Y.M.C.A. secretaries may determine the quality of his adjustment, as measureed by our criterion. Religious activities, good health, and the other factors listed may be so related as important factors in the adjustment of secretaries retired from the Young Men's Christian Association.

Summary and Conclusions

This study was an effort to determine the correlates of good and poor adjustment among a group of retired Y.M.C.A. secretaries. The criterion of adjustment was the total score on the Attitude Inventory of the schedule, *Your Activities and Attitudes.*

We wish to demonstrate the existence of certain relationships within the group of 161 retired Y.M.C.A. secretaries, having taken into account the biases found within our respondents. We believe that we have demonstrated within our particular group only that associations between some of the factors in the various areas and the quality of adjustment do exist.

Within our group more convincing, perhaps, than others were the associations in the areas of health, religion, economic security, and economic mobility. In these areas the coefficients of contingency were above 0.30. With the area of earlier life, our data were interpreted as offering insufficient evidence of an association. With geographic mobility, the direction of the association was negative. With the other areas included in our hypotheses the coefficients were mostly within the 0.20's. As we have stated previously, we believe these coefficients are indicative of an association because our criterion of adjustment is a *composite* score made up of scores on several different areas of attitudes.

To determine the effects of aging and to ascertain more conclusively the correlates of good and poor adjustment in old age, long-term longitudinal research is needed. The increasingly aging population of the United States points to the fact that prompt initiation of well-planned, comprehensive programs of longitudinal studies of the later span of life is essential. These studies need to employ many methods of determining physical-social-psychologic aspects of adjustment in later life, constantly improving, refining, and strengthening its tools

of assessment. Not only are studies of groups requisite, but also thorough, painstaking clinical case studies on social-psychologic and medical bases are vital to increasing valid knowledge of the experience of aging in our culture.

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A University Extension Course in Gerontology

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MR. PETERSON OUTLINES AN EDUCATIONAL COURSE IN GERONTOLOGY WHICH HE CONDUCTED AT THE UNIVERSITY OF ILLINOIS IN 1949-1950.

THE University of Illinois, through its Division of University Extension, has been active in adult education for many years. The Division has brought standard credit and noncredit course offerings to the various communities of the State, and, in addition, has sponsored many new and experimental courses tailored to meet adult needs.

With the flood of statistics from government offices indicating the rising numbers of older persons in our society and with the mounting attention being given by social scientists to the problems of older persons, it was no surprise when interest in a course in gerontology was discovered by extension specialists in various parts of the State. This interest, expressed by physicians, social workers, and civic leaders, reflected community needs for information concerning the physiologic and psychologic changes which people undergo in later maturity and for guidance in making adjustments to retirement and senescence.

This paper has been prepared as a response to the universities and other institutions which have inquired concerning the organization and the success of the experimental course developed by the University of Illinois, entitled Aging and Preparing for Advanced Years, initiated at Springfield, Illinois, October 15, 1949. The course will be given again this year, beginning about November 1, 1950, at Bloomington, Illinois.

Developing Course Materials.—The Dean of the Division of University Extension appointed a committee of staff members from the Departments of Education, Physiology, Physical Education, Psychology, the University Health Service, and the Division of Social Welfare Administration. This committee held several planning sessions to which each member brought books and articles pertaining to aging as applied to his field of interest. The scope and objectives of the proposed course were discussed and the various publications were reviewed with a view to determining their suitability as course content materials. The Dean then assigned the writer as instructor of the proposed course, and the committee passed along to him such materials as had been assembled and developed.

The ten study areas, described below, proved satisfactory from both the standpoints of sequential development and comprehensiveness. The organization of materials within these areas presented some problems, inasmuch as there are as yet no well-traveled paths in gerontology and as the field is still without a textbook which adequately summarizes the numerous aspects of aging in a manner suitable for classroom use. However, a valuable library of books and articles was assembled; these publications, together with notes from Dr. George Lawton's classes in aging at New York University and a number of papers on old age prepared by the writer as term projects for various graduate courses, served as basic source materials for classroom use.

Course Announcements.—Springfield, Illinois, was selected as the location for the first class. Arrangements were made to hold the course in the lounge of the Lincoln Library where comfortable chairs around a large table permitted the course to be offered in seminar fashion. The course was announced as designed for "persons over thirty who are interested in preparing for old age, persons already in advanced years, and persons who deal with and care for the aged." Publicity for the course was confined to the distribution of mimeographed notices to several civic and State agencies in Springfield. The course was

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presented as a ten-week offering, two hours per week, from 7:00 p.m. to 9:00 p.m. on Wednesdays. In accordance with the policy of the Division, a small tuition fee ($10 per person) was fixed for the course.

The Enrollees.—Twenty persons enrolled for the course at the opening session and all of these but one continued as regular attendants through the ten-week period. Only 3 of the enrollees had taken an extension course before. The mean age of the members was 53, with a range of from 30 to 70. Thirteen were women. Eleven were college graduates, and all but 2 of the remainder were high school graduates. The enrollees represented the following occupations:

6 representatives of welfare agencies
3 clerks
3 housewives
2 nurses
2 teachers
1 retirement officer
1 physician
1 salesman
1 retired banker

Each enrollee was asked to fill out a brief questionnaire at the opening session. In response to a question concerning reasons for taking the course, 10 class members stated that their interest in old age was principally professional, while the remaining 10 indicated that they had a personal interest in learning more about the processes of aging and in making plans for their own advanced years. In response to a question relating to personal retirement plans, 18 of the 20 indicated such nebulous plans as "travel, reading, and taking it easy;" only 2 stated that they had made definite and concise plans involving new activities which would occupy their time after retirement. In response to a question regarding attitudes held toward advanced years, all replies indicated some doubt concerning the satisfactions and rewards of old age as compared with those of earlier life periods.

Class Sessions.—The following paragraphs describe the course outline and present a brief summary of the materials covered at each session:

I. GERONTOLOGY, THE STUDY OF AGING. A summary of the problems faced by the rising numbers of older people in our society; the increasing longevity of man; current research and progress; the need for early retirement planning.

II. BUILDING A PHILOSOPHY TOWARD AGING. An evaluation of youth versus old age; cultural and historical practices and attitudes toward aging; contemporary attitudes; the role of religion; building a personal philosophy for aging successfully.

III. MEDICAL ASPECTS OF AGING. A nontechnical discussion of physiologic changes brought about in advancing years; effects of age on various functioning systems; diseases encountered in later years and their symptoms; hygiene and health planning. A physician from the University Health Service attended this session and, following the lecture, answered questions bearing on physiologic changes, diets, and health rules.

IV. PSYCHOLOGIC ASPECTS OF AGING. A review of research findings concerning mental ability in later maturity; mental disturbances and diseases in later years; adjusting to retirement; building emotional stability; techniques for dealing with loneliness; death fears.

V. SOCIOLOGIC ASPECTS OF AGING. A summary of the role of the older person in our society; living arrangements and community planning for the aged; organizations and institutions for older persons; the Social Security program and welfare services. The Danish film "The Seventh Age" was shown at this session.

VI. ECONOMIC ASPECTS OF AGING. A discussion of economic needs of older persons; current retirement plans in business and industry; the employability of older persons; economic aspects of government pensions and welfare programs; legal considerations.

VII. PLANNING FOR RETIREMENT. The hazards of abrupt retirement; an evaluation of various retirement plans; programs of gradual retirement; laying out specific goals for later years; retirement to Florida and new communities; the importance of continued activity in later years.

VIII. THE AGED IN THE COMMUNITY. Members of the class presented informal reports on interviews held with persons in the community over 65 years of age; reports outlined the interests, attitudes, and activities of persons already retired or in advanced maturity.

IX. PROFITABLE AND CIVIC ACTIVITIES FOR OLDER PERSONS. A discussion of the numerous jobs and pursuits in which older people can engage; how to start a small business; civic and social work opportunities in large and small communities. The monthly *Profitable Hobbies* provided valuable materials for use at this session.

X. RECREATION AND LEISURE TIME PURSUITS. A discussion of games and recreational activities for older persons; learning to appreciate the arts; new uses for leisure time. An exhibit was held of the handiwork and crafts of older persons in the community.

Class Participation.—It was apparent from the outset that old age is a more provocative subject than one is apt to suspect. The members of the class seemed eager to share their attitudes and experiences with reference to old age, and discussions frequently carried the sessions beyond the closing hour. One of the more interesting discussions concerned the distaste for growing old, which seems peculiarly prevalent in America. Certain members believed that this reaction is only natural in a modern, competitive society, and that that there is nothing which can be done about it. However, enrollees with a more optimistic turn of mind believed that through improved economic opportunities for older people and popularization of the satisfactions of later maturity, much could be accomplished to enhance the prevalent attitude toward growing old.

The employment difficulties facing older people were discussed at length at an early session. Later, at the session on economic aspects of aging, 2 class members reported on conversations which had been held with employment officers in several private firms. It was reported that these officers admitted discriminating against older job applicants, although they could present no concrete evidence of poor performance among older workers. The officers were agreed that in almost every large organization there are positions which could be satisfactorily manned by persons in good health over 60 years of age, but that in the absence of a company policy, custom and preference favor the selection of younger employees. It was the concensus of the class that, since research findings have now shown the capability of older persons in many fields of employment, campaigns should be initiated to publicize these findings and encourage employers to lift the barriers which face older people seeking employment.

As might be expected, one of the livelier discussions concerned current policies setting arbitrary retirement ages. Mandatory retirement at 60 or 65 was defended by several younger members of the class as desirable and sound personnel practice, while several older members of the class thoroughly condemned the practice as unscientific and wasteful of accumulated experience.

Another spirited discussion was initiated when the instructor presented the thesis that man should "age actively." At the beginning of the course, most class members seemed to favor the traditional objectives of retirement, i.e., "taking it easy," but later discussions indicated that a majority of class members had come to accept the view that, for successful retirement, the established activity patterns cannot be arbitrarily abandoned but must be supported by similar or compensating patterns.

Final Class and Exhibit.—As shown in the class outline, the final session consisted of a discussion of recreation and leisure time pursuits and an exhibit of the handiwork and crafts of older people. At this final session, the class members were guests of the Good Neighbors' Club, the only recreational organ-

ization for the aged in Springfield. Both the discussion period and the exhibit were open to the public and many guests were present. The founder of the Good Neighbors' Club had charge of the exhibit and, with the cooperation of the secretary of the Springfield Council of Churches, had arranged an excellent exhibit of the handiwork of older people in the community. The 44 displays included such creative arts and crafts as oil painting, doll and toy making, rug weaving, metal work, furniture and cabinet making, foods preparation, and photography.

Class Ratings.—In order to secure the reaction of class members to this experimental course and to discover how well the course materials and the instruction met individual needs and expectations, evaluation sheets were sent to all enrollees on which they were asked to give their candid opinions of the course and to mail the completed evaluation sheets, unsigned if they wished, to the Division of University Extension. The responses shown on these sheets indicated a lively interest in gerontology as a new field of study and a unanimity of opinion that the course was of practical value and should be offered in other communities of the State.

Summary

The development and organization of a university course in gerontology is outlined and a description of the course and the participants is presented.

Submitted for publication June 5, 1950

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The Dietitian in the Modern Home for the Aged

MARION H. ZETTERSTROM

A DIETITIAN OUTLINES THE OPPORTUNITIES AND RESPONSIBILITIES OF A DIETITIAN IN A HOME FOR THE AGED AND LISTS SOME TYPES OF FOODS PREFERRED BY OLD PEOPLE.

WITHIN the past ten years there has been a growing awareness of the aging of our population, and frequently quoted statistics on this subject are well recognized by the professional person and increasingly understood by the laity. The changing status of our population has given impetus to research in gerontology and geriatrics. Nutrition research in this field has made great strides but much remains to be learned. For example, we have as yet no specific nutritional standards for the aged person. Through pediatrics specific food standards for the younger segment of our population were developed. It remains for those who work with aged persons to formulate similar standards for the older group.

What is the place of the dietitian in this comparatively new field? Certainly it must present a challenge to her as it has to physicians, nurses, and social workers. It is the purpose of this presentation to show that the dietitian's services are needed and can be utilized succesfully in a home for the aged.

The actual duties and responsibilities of a dietitian in a home are comparable to those of the dietitian in a general hospital. The administrative dietitian purchases food, supplies, and equipment and is responsible for proper inspection of all deliveries. Many homes are in the process of modernization or expansion, and the dietitian may assist appreciably in planning layouts for dining rooms, kitchens, dishwashing rooms, and food storage facilities. She is responsible for menu planning and supervision of food production. The dietitian must be cognizant of differences in service necessary to a comparatively well, active group and a group of persons of a lesser degree of physical well-being, both of which groups are found in the average home.

The dietitian in a home for the aged, as in any other institution, must cooperate with all other departments. Team work is necessary to assure a smoothly running and efficient organization. Because the dietitian spends large amounts of institutional funds, she must be prepared to sit in on budget meetings.

Since physical debility is frequently first manifested in a patient's lack of appetite or peculiar reaction to food, the dietitian must cooperate with the Medical Department. Close observation by the dietitian and prompt referral to the physician may mean that the patient receives attention at a time when preventive treatment proves valuable. While the dietitian's prime purpose is to carry out the administrative and therapeutic duties ordinarily associated with her position, she will also, as has already been the case in the Home for Aged and Infirm Hebrews of New York, have the opportunity to work with physicians on research problems.

In most hospitals today the Nursing and Nutrition Departments are separate entities. However, in the average home, nurses still play a very active role in the food service. The nurse is usually responsible for actual service of food, particularly tray service. The dietitian must cooperate fully with the nurse since the nurse is often in a more strategic position to observe closely the patient's food habits and wants. A free interchange of observations and suggestions between the dietitian and nurse can therefore add to the ultimate care and well-being of the patient.

Cooperation between the Nutrition Department and Social Service Department is also essential. Recent investigations have demonstrated that emotions play an important part in the proper digestion and utilization of food. The atmosphere surrounding mealtime should

Marion Zetterstrom received her B.S. degree from the University of Minnesota in 1929. After a course as a dietetic intern at Ancker Hospital, St. Paul, Minnesota, in 1930, she was associated with several hospitals and some leading commercial concerns in the mid-west up until eight years ago when she assumed the duties as Director of Dietetics for The Home for Aged and Infirm Hebrews of New York. Miss Zetterstrom is a member of the American Dietetic Association, the Greater New York Dietetic Association, and the International Stewards and Caterers Association.

be as friendly and congenial as possible. The social worker, conversant as she is with the resident's family background, cultural standards, and character, is of great value to the dietitian in planning seating arangements in a large dining room where ambulant residents may be served. Conversely, the dietitian, by observance of the resident's behavior problems in relation to food problems, may pass on information which might prove valuable to the social worker in a final solution of general behavior problems.

The relationship which the dietitian establishes between herself and the resident is largely responsible for the ultimate success or failure of her efforts. The old person who enters a home often has a feeling, although it may be suppressed, of having been cast off. Psychologically food therefore may assume a somewhat distorted proportion in his new existence. The dietitian must be patient and always ready and willing to listen to complaints as well as praise. Very often the ironing out of a complaint will serve as a basis for imparting some small bit of nutritional knowledge which eventually will enable the older person to establish a better plan of eating.

Observations on Feeding the Aged.—Serving persons on a continuing basis, the dietitian must be alert in planning menus of varying interest and acceptability to persons of diverse racial backgrounds. High nutritional standards must be maintained and protective food elements provided in good measure.

In the absence of specific food standards for the aged, the nutritional standards as set up by the Food and Nutrition Board of the National Research Council for the normal adult may serve as the best guide (3). In agreement with prevailing theories that overnutrition, in regard to caloric intake, is not desirable, menus at the Home are planned to limit the caloric content to between 2000 and 2200 calories per day. We have accepted the standards for the sedentary male and female, with the exception of calories as previously mentioned. These standards as they appear in Recommended Dietary Allowances are as follows:

Food	Male	Female
Calories	2400	2000
Protein (gm.)	70	60
Calcium (gm.)	1.0	1.0
Iron (mg.)	12	12
Vitamin A (I. U.)	5000	5000
Thiamine (mg.)	1.2[1]	1.0[1]
Riboflavin (mg.)	1.8	1.5
Niacin (mg.)	12[1]	10[1]
Ascorbic Acid (mg.)	75	70
Vitamin D (I. U.)	[2]	[2]

[1] For adults receiving diets supplying 2000 calories or less, the allowances of thiamine and niacin may be 1 mg. and 10 mg., respectively.

[2] The need for supplemental vitamin D by vigorous adults leading a normal life seems to be a minimum. For persons working at night and for nuns and others whose habits shield them from sunlight, as well as for the elderly person, the ingestion of small amounts of vitamin D is desirable.

In order to know that these standards are being met, one week's menus each month are analyzed by use of the Donelson and Leichsenring short method for dietary analysis (1). Analyses, based on these tables, over a period of two to three years have shown that our diets are of the following approximate average composition: 2070 calories, 80 gm. protein, 70 gm. fat, 280 gm. carbohydrate, 1.22 gm. calcium, 1.68 gm. phosphorous, 10 to 12 mg.

iron, 7500 I. U. vitamin A, 75 mg. ascorbic acid, 1.23 mg. thiamine, 2.4 mg. riboflavin, and 11.5 mg. niacin.

While menus may be planned according to set formulae, it is important to know that the residents are eating the food served. Careful checks are made of tables and trays after each meal to ascertain the amounts and particularly the types of foods which are rejected.

Observations have led us to conclude that the following foods are generally unacceptable: poppy or caraway seeds, nuts, fruits such as cherries which have very small pits, fruits such as strawberries or kadota figs which have tiny seeds, raw vegetables unless they are crisp and finely shredded, too frequent cold-type meals, hard rolls, and any food which requires much chewing. Somewhat contrary to the general belief that the older person should have no fried foods or "gas-producing" foods such as cabbage, turnips, or watermelon, we have found these items to be quite generally popular. By judicious use of these foods, our residents are more satisfied with their meals and suffer no apparent ill effects.

Regardless of what foods are included we find that they must be soft. For example, pot roast is more acceptable than roast beef; canned peas are preferred to frozen or fresh; and a liver loaf is more desirable than broiled liver which can toughen so easily unless it is possible to serve it immediately after cooking. For those persons who are edentulous or who manifest other difficulties of mastication or swallowing, minced meats and pureed vegetables are made available. At their own request 45 of our 365 residents are served foods in this form.

Dairy foods are very well accepted. By allowing our residents to have hot or cold milk in addition to tea or coffee as a beverage, we have increased milk consumption by about 30 per cent. While fruit cup or fruit jucies are occasionally enjoyed as an appetizer, the great majority of the residents prefer a hot soup with their dinner regardless of whether it is a very cold or very hot day.

We have found that many of the residents prefer a cereal at supper, which is our lighter meal, instead of the main dish. Since the cereals served are of the enriched variety and the residents will eat bread (also enriched) and butter as well as dessert (frequently a fruit) we have determined that the substitution does not appreciably affect the nutritional content of the day's meals. We are planning shortly to experiment with the use of bread according to the formula developed by McCay (2).

Participation in the various educational programs in geriatrics offers the dietitian stimulating opportunities. Over a period of five years our institution has cooperated with the Department of Nursing Education of Teacher's College, Columbia University, in a course given to graduate nurses who are preparing for supervisory and teaching positions. From a single lecture, this has developed to include institutes and field work projects. The Nutrition Department has participated by giving talks on the approach to the dietary problems of the aged.

Summary

Responsibilities and opportunities for a dietitian in a home for the aged are outlined and observations on food intake and dietary preferences of elderly residents in the home are presented.

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3. *Recommended Dietary Allowances.* National Research Council Reprint and Circular Series, No. 192, Oct., 1948.

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CURRENT COMMENT

Where Should The Aged Sick Be Cared For?

Some advocate that the aged, chronically or acutely ill, should be given care in a general hospital. Others believe that such care should be provided in a home for the aged.

Adherents to the first belief consider that the aged should be treated on their clinical merits and not on the basis of their age, that if they require intensive medical care which only a general hospital can give they belong in a general hospital, that if they do not require such care, they should be provided for in their own homes under the medical protection of the general hospital, or in a substitute for their homes (such as a home for the aged) with the understanding that the institution which receives them is a substitute for the home and not a substitute for the hospital.

Those who recommend the second plan suggest an infirmary within the home grouping to care for the acutely or chronically sick and transferral to a general hospital for complicated diagnostic or therapeutic procedures. It is considered that it is economically unsound to care for long term aged sick in expensive general hospital beds, whereas the opponents believe that it is less expensive to take care of the medically eligible aged in the general hospital than to provide for their difficult and complicated problems independently by expensive duplication of personnel and facilities elsewhere.

Supporters of both ideas agree that at the present time there are not enough hospital beds, that hospitals for chronic diseases are not the solution to the problem of caring for the aged sick, and that the able-bodied and only partially handicapped should be kept, as far as possible, in the community under the supervision of an extra mural care program in order that expensive hospital beds may be freed for more intensive use.

These two approaches to the problem do not seem completely incompatible, particularly on the basis of their points of agreement. In addition, it is only a large organization for the aged which could maintain an adequate infirmary; the smaller ones must necessarily rely on the general hospital. And even a large infirmary must at times make use of the general hospital.

Dr. E. Cowles Andrus, Baltimore, Maryland, was installed as President of the American Society for the Study of Arteriosclerosis at the annual meeting in Chicago in November. Dr. G. Lyman Duff, Montreal, was chosen Vice-President, and Dr. O. J. Pollak, Quincy, Massachusetts, was re-elected Secretary-Treasurer.

The establishment of the JOURNAL OF GERONTOLOGY was made possible by a grant from the Josiah Macy, Jr. Foundation.

The hieroglyphics, "The Beginning of the Book for Transforming an Old Man into a Youth," at the top of this editorial page, are from the Edwin Smith Surgical Papyrus, translated by Professor John Breasted, University of Chicago Press.

ORGANIZATION SECTION

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Minutes of the Fifth Annual Meeting of the Members of the Corporation of Gerontological Society, Inc.

The meeting was called to order at 1:00 P.M. on November 12, 1950, in the Roof Dining Room of the Rand Johnson Building, St. Louis, Missouri.

Present in person were: Ernest W. Burgess, John Esben Kirk, Oliver H. Lowry, Robert A. Moore, Ollie A. Randall, Nathan W. Shock, Henry S. Simms, C. J. Van Slyke, and Frederic D. Zeman.

Absent were: Joseph C. Aub, George E. Johnson, Ephraim Shorr, and George B. Wislocki.

Marjorie Lawson was also present.

Those present in person constituted a quorum for the transaction of business. Dr. Van Slyke, as President, acted as Chairman of the meeting. Dr. Simms acted as Secretary of the meeting.

The Chairman presented a certified copy of a Notice of the Meeting mailed to all the members of the Corporation on October 23, 1950. This was approved and ordered filed with the minutes.

The minutes of the Fourth Annual Meeting of the Members of the Corporation of Gerontological Society, Inc. were read and upon motion duly made, seconded, and carried, they were approved.

The Chairman pointed out that the term of office of the following members of the Corporation and of the Council had expired:

C. J. Van Slyke (as President)

Frederic D. Zeman (representing the Medical Research Section)

George B. Wislocki (representing the Biologic Research Section)

Ernest W. Burgess (representing the General Section),

that Robert A. Moore had resigned as Editor-in-Chief, and that Henry S. Simms had resigned as Secretary.

Dr. Ernest W. Burgess was nominated for a term of two years (as President-elect during 1951, and as President during 1952). Dr. John Esben Kirk was nominated as Editor-in-Chief for one year and Dr. Nathan W. Shock was nominated as Secretary for one year.

The following persons were nominated to serve as members of the Council for a term of three years:

Edward J. Bortz (representing the Medical Research Section),

Warren Andrew (representing the Biological Research Section),

Oscar Kaplan (representing the General Section),

George E. Wakerlin was nominated to serve a term of two years in place of Nathan W. Shock as representative of the Biological Research Section.

There being no other nominations, on motion duly made, seconded, and carried, the above persons were elected to serve their respective terms until the election of thir successors, sub-

ject to their election by the Society as officers and members of the Council.

Dr. John Esben Kirk, as Treasurer, presented a report of the Corporation. By unanimous vote the report was accepted and ordered filed with the minutes.

There being no other business, upon motion duly made, seconded, and carried, the meeting was adjourned.

HENRY S. SIMMS
Secretary

Minutes of the Fifth Annual Meeting of the Council of Gerontological Society, Inc.

HELD ON NOVEMBER 12, 1950

The meeting was called to order at 1:15 P.M. on November 12, 1950, in the Roof Dining Room of the Rand Johnson Building, St. Louis, Missouri.

Members of the Council present were: Ernest W. Burgess, John Esben Kirk, Oliver H. Lowry, Robert A. Moore, Ollie A. Randall, Nathan W. Shock, Henry S. Simms, C. J. Van Slyke, and Frederic D. Zeman.

Absent were: Joseph C. Aub, George E. Johnson, Ephraim Shorr, and George B. Wislocki.

Marjorie Lawson was also present.

A copy of the Notice of the Meeting, mailed to all the members of the Council, was presented by the Secretary and was ordered filed with the minutes.

The minutes of the Fourth Annual Meeting of the Council and of the Special Council Meeting held November 5, 1949, were read and approved.

Dr. Kirk presented a report of the Treasurer for the first ten months of 1950 and stated

TABLE I. MEMBERS

Total full membership, December 1, 1949		273
New Members (1950)		138
		411
Resigned or dropped	15	
Members in arrears for 2 years	18	
		33
Total full membership, November 1, 1950		378

TABLE II. MEMBERSHIP OF GERONTOLOGICAL SOCIETY BY FIELDS OF INTEREST

FIELDS OF INTEREST	Year				
	1946	1947	1948	1949	1950
Clinical Medicine	43	73	101	164	190
Botany	1	1	1	1	0
Anatomy and Pathology	9	15	16	19	37
Biochemistry	4	4	5	6	15
Physiology	7	9	16	22	27
Psychology	6	9	14	22	39
Sociology	5	5	6	12	17
Social Work and Institutional Administration	2	6	11	18	31
Nursing	0	0	1	2	5
General	3	5	8	19	17
Total Members	80	127	179	285	378

that a complete financial report would be available after the annual audit at the end of the calendar year. The report was approved and ordered filed with the minutes.

Dr. Shock presented a report of the Membership Committee, which was unanimously approved and ordered filed with the minutes.

Dr. Moore presented a report of the Editor-in-Chief of the Journal of Gerontology. After some discussion it was moved, seconded, and carried that the report be accepted and ordered filed with the minutes.

Editor's Report for 1950

There were 420 pages and 32 original papers in volume 5 covering the following fields:

Biologic and medical sciences	25
Social sciences	6
Humanities	0
General	1

As of November 1, 69 papers have been submitted for publication, 12 more than last year, 26 more than in 1948, and 40 more than in 1947; 24 were rejected, and of the 24 as yet unpublished, 11 will appear in the January, 1951, issue. Nine of the remaining 13 have been accepted for publication; action on the other 4 has not as yet been completed. I wish to thank the reviewers, who have given valuable assistance in determining acceptance or rejection of manuscripts.

Other statistics on the editorial make-up of volume 5 according to sections are:

Historical Section	4 Pages
Current Comment	18 Items
Organization Section	30 Pages
Gerontologic Reviews	1 Topic
Book Reviews	19 Books
Index of Current Periodical Literature	62 Pages
Author Index to Literature	6 Pages
Index to Volume 5	3 Pages

Beginning with the April issue, Dr. N. W. Shock took charge of the Index to Current Periodical Literature. The index is classified according to subject categories used in a Bibliography of Gerontology and Geriatrics which has just been published. As far as possible references are classified according to organ systems. Cross references are indicated by number at the end of each section. With the October issue, a new feature, an Author Index to Current Periodical Literature, has been added.

Again this year the program and abstracts of papers presented at the annual scientific meeting were published in the Organization Section of the October issue. A list of the members of the Gerontological Society for 1950 was also published in this issue.

Only one gerontologic review was submitted this year in spite of efforts of the Managing Editor to secure others for publication.

Two reports were received on foreign gerontologic activities—one from Dr. Jalavisto of Finland and one from Dr. Fleetwood of Ireland, who has accepted an appointment as foreign correspondent for Ireland. Letters have been written to the 8 foreign correspondents reminding them that reports on gerontologic activities and literature in their countries are due. Seven original papers from foreign countries were published this year and in addition 4 have been received and are awaiting publication.

Direct mail campaigns and exhibits of the Journal were again employed to increase the number of subscribers. Letters were sent to public health agencies and physicians, homes for the aged, and medical and hospital libraries, and further campaigns are planned. Exhibits were held at the National Library Association convention in Atlantic City and at the Special Libraries Association convention in Boston in June, and copies of the Journal have been sent to several other meetings, including the American Psychological Association in State College, Pennsylvania, the Institute on Geriatric Nursing in Chicago, the National Conference on Aging in Washington, D. C., the American

Occupational Therapy Association convention in Denver, the National Conference of Social Work in Atlantic City, and the Ohio Welfare Conference in Columbus.

The subscription list has increased again this year. While on January 1 the list of subscribers dropped to 638 it has increased as of November 1 to a total of 1016. There is a total of 378 members of the Gerontological Society, 361 of whom have paid their dues and are receiving the Journal. In addition 11 new memberships for 1951 have been received so far.

This year completes five years in which I have acted as Editor-in-Chief of the Journal. Although I have continued and shall continue to be interested in gerontology and the Journal, my activities in other fields are such as to detract from the time I can give. Two years ago Dr. Esben Kirk became Associate Editor and then Managing Editor. For the past year he has carried almost the entire load and any credit for the value of the Journal should go to him. He is active in this field and his primary interest is gerontology. The person who does something should receive the public acknowledgement of it.

ROBERT A. MOORE
Editor-in-Chief

Upon motion duly made, seconded, and carried, the following officers were nominated to serve during the year 1951 and until election and qualification of their successors:

President	Robert A. Moore
President-elect	Ernest W. Burgess
Treasurer	John Esben Kirk
Editor-in-Chief	John Esben Kirk
Secretary	Nathan W. Shock

Upon motion duly made, seconded, and carried the following individuals were nominated to serve on the Council for the indicated period of years as representatives of their respective sections:

Edward L. Bortz, for three years (to represent the Medical Research Section)

Warren Andrew, for three years, and George E. Wakerlin for two years, in place of Dr. Shock (to represent the Biological Research Section)

Oscar Kaplan, for three years (to represent the General Section)

The question of the continuation of the Publication Committee was discussed and a proposal from Dr. Hoskins, the present Chairman of that Committee, that the Publication Committee be disbanded was given consideration. On motion duly made, seconded, and carried it was voted that the incoming president would be authorized to appoint such committees as may seem appropriate.

A letter from Dr. Malford W. Thewlis was presented to the meeting. This letter proposed that Gerontological Society unite with the American Geriatrics Society in creating a division of Medical Memorial Fund to raise money for research on aging. After discussion, upon motion duly made, seconded, and carried, it was voted that a special committee be appointed to meet with representatives of the American Geriatrics Society for further discussion of this plan.

Another letter from Dr. Thewlis was presented, proposing that the two societies unite in the construction of an association to be known as "The Associated Gerontological and Geriatrics Societies." According to this proposal each society would retain its autonomy but a governing body consisting of representatives of both groups would be in charge of cooperative activities. Upon motion duly made, seconded, and carried, it was voted that the Affiliation Committee of this Society be authorized to give the matter further consideration.

The Council decided that the next scientific meeting will be held in conjunction with the Second International Gerontological Congress to be held in St. Louis, September 9-14, 1951. An invitation from the American Geriatrics Society to meet with them in Atlantic City on June 7-9, 1951, was considered, but it was the opinion of the Council that it might be mutually desirable if the American Geriatrics Society were to join with Gerontological So-

ciety, Inc. at the Second International Gerontological Congress in September. It was also suggested that the American Geriatrics Society might be invited to a joint meeting to be held in 1952.

A letter from Dr. A. J. Carlson inviting Gerontological Society to become a member of the National Society for Medical Research was presented, and after discussion it was voted to present the matter to the members of the Society for consideration at the Business Meeting.

There being no other business, upon motion duly made, seconded, and carried, the meeting was adjourned.

HENRY S. SIMMS
Secretary

Minutes of the Third Business Meeting of Gerontological Society, Inc.

The meeting was called to order at 4:10 P.M. in the auditorium of the Washington University School of Medicine, St. Louis, Missouri, on November 12, 1950.

Dr. C. J. Van Slyke, President of the Society, acted as Chairman of the meeting. Dr. Henry S. Simms acted as Secretary.

Dr. Simms read the minutes of the Fifth Annual Meeting of the Council of Gerontological Society, Inc.

There was some discussion of the possibility of arranging a joint meeting with the American Geriatrics Society. It was pointed out that, although the American Geriatrics Society had invited Gerontological Society, Inc. to meet with them in June, this Society had already made plans for a meeting in September in conjunction with the Second International Gerontological Congress. It was hoped that the American Geriatrics Society might join with us at the Congress and that a joint meeting might be arranged in 1952.

The Secretary presented the nominations of the Council for the following officers to serve during the coming year:

President	Robert A. Moore
President-elect	Ernest W. Burgess
Treasurer	John Esben Kirk
Editor-in-Chief	John Esben Kirk
Secretary	Nathan W. Shock

and the following members of the Council, each to serve for the indicated period of years:

Edward L. Bortz for three years (representing the Medical Research Section)

Warren Andrew for three years (representing the Biological Research Section)

Oscar Kaplan for three years (representing the General Section)

George E. Wakerlin (to serve a term of two years in place of Nathan W. Shock as representative of the Biological Research Section). It was moved, seconded, and carried that the Secretary be instructed to cast a unanimous ballot for the slate as nominated.

Dr. Shock presented a report of the Membership Committee. The Chairman pointed out that there had been approximately a 40 per cent increase in memberships during the past year.

A report of the Registry Committee was read by its Chairman, Dr. Hueper, recommending the activation of the Registry of Gerontology.

Recommendation of the Chairman of the Registry Committee

As the result of the various discussions, correspondence, and meetings of the members of the Registry Committee, a scheme was adopted to activate the Gerontological Registry through the creation of three (3) collection and research islands located in Boston under Dr. Jetter, in St. Louis under Dr. Lansing, and in Washington under Dr. Klinck.

It was decided that at these centers both data on functional, clinical pathology as well as on morphologic pathology related to physiologic aging were to be collected, evaluated, and integrated. Since emphasis was placed on ascertaining abnormalities of physiologic aging during all periods of life, it was recommended to use for such investigations only individuals who had been or were free from infectious diseases (severe acute or chronic) and from degenerative congenital disorders. For putting this plan into operation, it was considered essential that each of the three centers should apply for a grant of approximately $3000 per year during the test period of this program, which it was believed might extend for about three years.

At the end of this period the results obtained through this approach were to be analyzed and evaluated and a decision then was to be made whether or not the program should be continued as originally planned, should be discontinued as unprofitable and unsuitable, or be modified.

The Chairman believes that the following recommendations are in order.

1. Any program to be decided upon should include studies of both clinical-functional as well as morphologic-pathologic nature and should aim at the integration of the data obtained by the two approaches.

2. Although there may exist divergent opinions as to the merits of the program proposed, it is most important that a practical step should be taken now for the activation of the Registry. Postponement of this step and continuation of the discussion phase would merely prolong for at least another year the inactive phase of the Registry. Although changes may have to be made later in the type and technique of studies advocated, at least some valuable experiences will have been gained which can be utilized in any future decisions on the operation of the Registry.

W. C. HUEPER
Chairman

The Chairman commented that the Registry Committee had met on at least three occasions during the past year and asked that advice and suggestions be relayed to the incoming President of the Society.

The Chairman announced that the next scientific meeting of the Society would be held in conjunction with the Second International Congress September 9-14, 1951, in St. Louis, Missouri.

The Secretary presented a letter from Dr. A. J. Carlson inviting Gerontological Society to become a member of the National Society for Medical Research. After discussion a motion was made, seconded, and carried that Gerontological Society, Inc. join the National Society for Medical Research as a sponsoring member and that the amount of contribution to be made by the Society be referred to the Council.

There being no other business, upon motion duly made, seconded, and carried, the meeting was adjourned.

HENRY S. SIMMS
Secretary

Officers and Council of Gerontological Society, Inc., 1951

President	Robert A. Moore
President-elect	Ernest W. Burgess
Treasurer	John Esben Kirk
Editor-in-Chief	John Esben Kirk
Secretary	Nathan W. Shock

Medical Research:	*To Serve Until:*
Joseph C. Aub	1951
Ephraim Shorr	1952
Edward J. Bortz	1953

Biological Research:	*To Serve Until:*
Oliver H. Lowry	1951
George E. Wakerlin	1952
Warren Andrew	1953

General:	
George E. Johnson	1951
Ollie A. Randall	1952
Oscar J. Kaplan	1953

Gerontologic Conferences in Europe in the Summer of 1950

E. V. COWDRY

Three such meetings devoted exclusively to gerontology were held. The impulse behind all of them was conviction in the minds of farsighted people in many lands of the importance of the problems of aging. It is important for us in the United States to be informed in regard to the particular problems under investigation, to become familiar with the names of the leading investigators, and to learn how most directly to seek further data. The following report is not to be confused with the official transactions of the meetings for it is in many respects incomplete and emphasis has been given to what I think will be of special interest to gerontologists in this country.

I. *Primer Congreso Nacional de Geriatría,* Barcelona, Spain, June 15-18. Arranged by the Sociedad Española de Geriatria.

Dermosifiliografía

VILANOVA MONTIU Y F. OLLER COROMINAS: El cáncer cutáneo mucoso en los viejos. Estudio estadístico del Servicio Clínico anejo a la Cátedra de Dermatología de la Facultad de Medicina de Barcelona.

VILANOVA MONTIU Y F. OLLER COROMINAS: Nuevas técnicas para el tratamiento del cáncer del labio.

VILANOVA MONTIU: Un diagnóstico fundamental en la piel de los viejos: el Queratoma senil.

S. NOGUER MORE: Orientaciones terapéuticas acerca el prúrigo senil.

J. MERCADAL PEYRI Y J. SANS MASCARO: La tuberculosis cutánea en la vejéz.

Hematología

M. SORIANO JIMENEZ Y J. VIVES MANE: La hematología geriátrica.

P. FARRERAS VALENTI Y C. LLEVARIA REGALADO: La leucemias en el viejo.

L. G. REITG PUIG Y C. LLEVARIA REGALADO: Frecuencia de la anemia perniciosa en la senectud.

J. GRAS RIERA Y R. BACARDI NOGUERA: Las proteínas plasmáticas en la senectud.

E. ALCALA LLORENTE: Estudio estadístico sobre morbilidad y mortalidad por enfermedades de la sangre en las edades geriátricas en Valencia y provincia.

Ginecología

V. CONILL MONTOBBIO Y V. CONILL SERRA: Tratamiento del prolapso uterino. Proyección de un film.

J. VANRELL CRUELLS: Ginecología geriátrica en su aspecto quirúrgico.

I. COMAS FUNALLET Y J. VANRELL CRUELLS: El ovario senil.

Urología

J. M. LUCENA RAURICH: Disuria senil.

E. ALDUNCIN LARDIES: El corazón del viejo ante la prostatectomía.

P. GAUSA RASPALL: Disquisiciones abreviadas de geriatría urológica.

L. BATALLA SABATER: La edad y otros factores en prostatectomía.

Pulmón

M. SORIANO JIMENEZ Y M. GONZALES RIBAS: La tuberculosis pulmonar en el anciano. Datos deducidos de la estadística recogida en la Clínica Médica B.

J. CORNUDELLA CAPDEVILA Y J. AGELET ARGILAGA: Neumotórax terapéutico a partir de los 50 años de edad.

J. CIVIL INGLES: Posibilidades del viejo en relación a la colapsoterapia quirúrgica.

T. LORENZO Y F. COLL COLOMER: Toracoplastía en el viejo.

F. AYUSO DE BUSTAMANTE: La toracoplastía en los viejos.

F. AYUSO DE BUSTAMENTE: Un infiltrado de diagnóstico difícil.

T. SEIX MIRALTA Y J. ESTELA RAGUE: Evolución de la tuberculosis pulmonar en los viejos.

T. SEIX MIRALTA Y J. ESTELA RAGUE: Formas iniciales de la tuberculosis pulmonar en la edad senil.

T. LORENZO: Quiste hidatídico del pulmón en el viejo.

R. FROUCHTMAN: Asma y tuberculosis en los viejos.

R. FROUCHTMAN: Caracters etiopatogénios y clínicos del asma bronquial en los viejos.

F. MANCHON AZCONA: Caracteristicas radiológicas en los estados asmáticos de los viejos.

A. AMELL SANS: Etiopatogenia de las esclerosis pulmonares difusas primitivas.

A. AMELL SANS: Las formas individuales de delinación del mesenquima pulmonar y sus conceptos: esclerosis, fibrosis, cirrosis.

J. ORIOL ANGUERA Y J. PALOU LLAUDET: Influencia del neumoperitoneo sobre la movilidad diafragmática en el viejo.

J. ORIOL ANGUERA Y J. SASTRE TORRUELLA: Nuestra estadística de tuberculosis pulmonar en el anciano.

J. PALOU LLAUDET: La broncoscopia en el viejo.

J. RIERA GALLO: Estudio epidemiológico de la patología respiratoria geriátrica de Barcelona.

Endocrinología y Nutrición

J. MANGUIO FONTS: Problemas metabólicos que plantea la diabetes en la senilidad.

J. M. VILACLARA MIR: ¿ Existe la diabetes senil?

J. M. VILACLARA MIR Y R. VIDAL RIBAS: Las hiperglucemias y las glucosurias de la vejez.
J. M. VILACLARA MIR: La insulinoterapia en los diabéticos ancianos.
P. CAMPS JUNCOSA: La dietética en el viejo diabético.
J. M. DE RAMON ESCARDIO: Consideraciones clínicas acerca la función tiroidea en los viejos.
CH. NOGALES DE QUEVEDO Y M. SANTALO: Hipertiroidismo en la senectud.
J. MONGUIO FONTS: Contribución al estudio del climaterio masculino.

Aparato Digestivo y Cirugía

P. PIULACHS OLIVA: La apendicitis en el viejo.
J. MAS OLIVER: Movilización y levantamiento precoces de los ancianos laparotomizados.
J. SALARICH TORRENTS: El preoperatorio en geriatría.
J. PI FIGUERAS: La cirugía abdominal en geriatría.
J. PRIM ROSELL: Apendicitis en el viejo.
J. PRIM ROSELL: Vólvulos de intestino grueso en el viejo.
J. VILAR BONET: Ileo biliar en la vejez.
J. VILAR BONET Y L. G. REITG PUIG: Pancreatitis aguda hemorrágica en el viejo.
R. BACARDI NOGUERA Y F. CISCAR RIUS: Cirrosis hepáticas seniles.
D. MOXO QUERI: La patología gástrica del viejo.
J. M. MASRIERA SEGALES: Ulcus gástrico en el viejo.
C. SALA PARES Y M. MISERACHS SALA: Las fracturas de cadera en la vejez.
L. GUBERN SALSSACHS: Actitud del geriatría ante las fracturas del cuello del fémur de los ancianos.
J. VANRELL CRUELLS Y J. COMAS FUNALLET: El ovario senil.
P. BARCELO TORRENT Y E. BATALIA BOIXET: La poliartritis crónica en le viejo.
J. FORESTIER Y J. ROTES QUEROL: Clínica de la hiperostosis anquilosante vertebral senil.
J. ROTES QUEROL Y J. FORESTIER: Anatomía patológica de la hiperostosis anquilosante vertebral senil.

Psiquiatría y Neurología

R. SARRO BURBANO: Trastormos mentales de la edad involutiva.
J. SOLE SEGARRA: Higiene mental y geropsiquiatría.
A. MARTI GRANELL: Peculiaridades del electroschock en el viejo.
J. CAMPS PIERA Y B. RODRIGUEZ ARIAS: Estudio anatomoclínico de una paciente encefalomaláfica.
J. GUINOVART SOLE Y B. RODRIQUEZ ARIAS: Consideraciones anatomoclínicas sobre dos casos de senilidad.
C. LAMOTE DE GRIGNON Y B. RODRIQUEZ ARIAS: Contribución al diagnóstico causal de los síndromes parkinsonianos.
J. SIMARRO PUIG: Tratamiento de la arterioesclerosis cerebral.
J. R. DE OTAOLA SANTIBANEZ: El tratamiento de las afecciones vásculo-involutivas del encéfalo por la dielectrolisis transcerebral.
J. VILA BADO Y J. SAMSO DIAZ: Electroencefalogramas en la vejez.
J. OBIOLS VIE, M. DE LA CRUZ TOBAR, Y DR. P. PUIG MASET: La terapéutica de los síndromes depresivos de la involución por el succino-dinitril.

Temas Diversos

M. SORIANO Y F. ALCANTARA: La mortalidad en la edad avanzada. Resultados estadísticos de 586 autopsias practicadas en la Clínica Médica B.
M. SORIANO Y A. BALCELLS GORINA: Datos estadísticos de morbilidad en la edad avanzada.
C. SOLER DOPFF: La infección en la edad avanzada.
M. HERRERO BESADA: Jerarquización de un proceso de la vida.
J. SIMARRO PUIG Y J. LLORET CASANOVAS: Frecuencia de tumores múltiples ignorados en viejos.
V. M. BUXO FERRER: Las úlceras por decúbito.
A. MORAGA VALENZUELA: La fiebre en el viejo.
A. DANES FELIU, R. PASCUAL CLAPES, Y J. MIR CLAPES: Resultados de la revisión pulmonar y circulatoria, e índice de óbitos en los ancianos de la Casa Provincial de Caridad de Barcelona.

Estomatología

S. FORTEZA: La boca del viejo.
M. LIDJI: Prótesis dentaria total en el viejo.
M. LIDJI: Profilaxia de las posibles dificultades en la prótesis del viejo.

Cardiología y Angliogía

J. GIBERT QUERALTO: La insuficiencia cardíaca atípica del viejo.
J. GIBERT QUERALTO: Atipismo clínico del infarto de miocardio en el viejo.
M. SORIANO Y M. BALCELLS GORINA: La hipertensión en los pacientes de edad avanzada.
F. VEGA DIAZ, J. RIVES BLAY, Y M. ANDONEQUI: Pruebas funcionales del aparato cardiovascular del anciano.
D. DURAN ARROM: Colesterina y colinesterasa en vasculopatías.
D. DURAN ARROM: Valvulopatías en la vejez (Casa Provincial de Caridad).
A. RODRIGUEZ ARIAS: Ganglioctomías en los ancianos.
J. PEDRO BOTET: La arteritis de la temporal.
J. SIMARRO PUIG Y J. LLOR CASANOVAS: Frecuencia real de cardiopatías.
A. CISCAR RIUS Y R. FROUCHTMAN: El electrocardiograma en el asma bronquial de los viejos.
A. CISCAR RIUS: El infarto de miocardio en el viejo.
A. CISCAR RIUS: La fase de comienzo de la arritmia completa senil.
M. TORNER SOLER Y J. BALAGUER VINTRO: El electrocardiograma patológico del viejo.
E. JUNCADELLA FERRER: Las alteraciones electrocardiográficas en los cardíacos de edad avanzada.
R. CAMBRA MERCADER Y J. CUXART BARTOLI: Interés del estudio de la velocidad de circulatión en el viejo.
J. PARAVISINI PARRA Y L. ROBERT ROBERT: Un caso de trombosis arterial mesentérica.

I was invited to this congress but unfortunately could not attend. However, the titles of the papers and the talks I had with the organizers of the congress later on in Liège showed clearly that the medical profession in Spain is actively engaged in gerontologic research and fully appreciates what can be gained thereby for the public welfare. It was definitely a national effort with no encouragement from abroad or participation by non-Spaniards. Already the publications of this congress have

begun to appear. The one on Osteoporosis Senil by M. Pañella-Casas and J. Monteys-Porta is a fine presentation of over a hundred pages and many excellent plates. Details of the congress can be obtained from Dr. Pañella-Casas, Hospital Municipal de Nuestra Señora de la Esperanza, Barcelona, Spain.

II. *Lord Nuffield's Conference on Gerontological Research, London, England, July 8.*

This was arranged by Dr. V. Korenchevsky. Its purpose was to ascertain the most important and feasible lines of investigation.

Attendance.—Lord Nuffield personally invited A. J. Carlson, E. V. Cowdry, R. A. Moore, A. I. Lansing, and N. W. Shock to attend the conference. All accepted and were present with the exception of A. I. Lansing. These four from the United States were joined by the entire Executive Committee of the British Society for Research on Ageing consisting of:

F. A. E. Crew, Professor of Social Medicine Edinburgh University (Chairman).
E. C. Dodds, Professor of Biochemistry, London University.
Sir Francis Fraser, Professor of Medicine, Chairman of the Postgraduate Medical Federation Central Office, London University.
H. D. Kay, Director of the National Institute for Research in Dairying, Reading University.
Lady Robinson, Organic Chemist, Oxford University, Wife of Sir Robert Robinson, President of the Royal Society (Hon. Treasurer).
V. Korenchevsky, Head of the Oxford Gerontological Research Unit, Oxford University (Hon. Secretary).

Discussion.—Lord Nuffield presided. He welcomed the four representatives of the (American) Gerontological Society and the Executive Committee of the British Society. He explained that it was desirable to bring together those investigating the great problem of aging on both sides of the Atlantic, that they had a common aim, and that he would like to have guidance from them. Dr. V. Korenchevsky, who has so ably inspired research on aging on an international basis, spoke briefly and described Lord Nuffield's leadership and generosity. Each participant, except Lady Robinson, led the discussion in turn.

It was agreed that the public is not alive to the benefits to be derived from research on aging and that well directed publicity is essential. The opinion was expressed that financial aid for long term research will be forthcoming when the public becomes interested and leaders in finance, education, government, and other walks of life become convinced of the importance of the major research objectives and of the feasibility of attaining them. In other words, it is desirable to come down from generalities to specific issues. The program for research needs to be sharpened up by localizing the sectors of the front where the most strategic advances can be made by personnel and equipment available and likely to prove effective. Several suggestions were offered as to major objectives of research on aging considered to have both the desiderata of fundamental importance and feasibility.

1. Aging of elastic tissue.

Importance.—Maintenance of elasticity in many parts of the body obviously is essential. We think at once of the skin, of elastic arteries, of the lungs, of the alimentary tract, of the urine bladder, and so on. Elastic fibers are comparable to the steel springs that provide recoil mechanisms large and small without which a motor car, for instance, could not operate.

Feasibility.—Two recent inventions are now available. The first is the electron microscope by which the physical properties of elastic fibrils can be investigated. It can be as useful in this investigation as it has proved to be in the study of steel and other materials employed in industry. The second are chemical techniques by which elastin can be analyzed quantitatively and in some measure qualitatively.

2. Replacement in the body.

Importance.—When an engine grows old in service the efficiency of performance of some parts decreases to the point where replacement by entirely new parts is necessary. In the body worn out organs are not similarly cast aside

and replaced by new ones. On the contrary, their peaks of performance are maintained as long as possible by continuous and orderly replacement of the materials that enter into their construction.

The structural organization in space, that is, the arrangement of the said materials, remains substantially the same. It is as if in an automobile tire new rubber and binding materials were continuously produced to compensate for wear and tear, the whole maintaining its original structure. It is as if all the steel parts were continuously being replaced by new steel. In fact, within the body fats and proteins, carbohydrates and minerals are being replaced as long as life lasts. It is important to measure the rates of these replacements as age advances with the hope of being able easily to detect faulty replacements and to correct them.

Feasibility.—The great medical contribution of the scientific advances made in the production of atomic bombs, is the ability to mark the replacing substances with radioactive isotopes and thus to measure accurately their rates of incorporation into the body machinery. Consequently this basic line of investigation of aging can now be carried forward.

In mentioning these and other medical objectives it was clearly understood that, in the biologic, sociologic, and economic aspects of the problems of aging, other objectives both important and feasible demand equally close attention. It was agreed that organized research by groups of investigators should supplement the pioneering work of individuals but in no sense replace it. Imagination and initiative should be encouraged. Too great emphasis on evidence as to importance might well direct attention away from fundamentals of equal or greater significance in the long run.

It was also pointed out in this discussion at Lord Nuffield's conference that research could be greatly advanced in at least two ways:

1) While it was not deemed appropriate at present to add substantial courses on gerontology to the medical curriculum, it was the unanimous opinion that a few carefully prepared lectures would be decidedly worth while. These should be integrative and bring together work on aging going on in many departments. It is expected that their presentation would inform both students and staff of attractive opportunities for research.

2) Those attending the conference were convinced of the value of international cooperation and so it was natural that a proposal made by Dr. Robert A. Moore to establish a system of international fellowships in gerontology should be enthusiastically endorsed.

The discussion, so auspiciously started by Lord Nuffield, was continued at the immediately following larger conference in Belgium. It is possible that Lord Nuffield will wish Dr. V. Korenchevsky to release a more adequate account of this important conference.

III. First International Conference of Gerontology, Liège, Belgium, July 10-12.

This was actually a meeting of the International Association of Gerontological Societies under the Presidency of Prof. L. Brull.

Attendance, 96.

Belgium—The Belgian Gerontological Group — 28
Canada—The Canadian Gerontological Group — 2
Denmark — The Danish Society for Research on Ageing — 2
Finland—Societas Gerontologica Fennica — 1
France — French Society for Gerontology — 6
Great Britian—1) British Society for Research on Ageing — 4
2) Scottish Branch — 2
3) British Medical Society for the Care of the Elderly — 1
Holland—Dutch Society of Gerontology — 9
Ireland—Irish Gerontological Society — 1
Italy—Italian Gerontological Group — 18
Portugal—Portugees Society of Gerontology — 1
Spain—Spanish Gerontological Society — 1
Sweden—Swedish Society of Gerontology — 9
Switzerland—Swiss Group for Research on Ageing — 2
United States—1) Gerontological Society, Inc. } — 4
2) Club for Research on Aging }
3) American Geriatrics Society — 1
4) American Arteriosclerosis Society—1
Visitors —2

As far as is known all of the gerontologic societies of the world were represented except those of Argentina, Australia, and Czechoslovakia. That these societies should be formed in so many countries is evidence that in each the problems of aging are considered so important that group action is necessary. That their representatives should accept the invitation of Professor Brull to meet together in Liège is evidence of the belief that much is to be gained by international cooperation. It is to be noted that this conference developed from an impelling desire for exchange of opinion, for the cross fertilization of ideas between nations, without the impetus of financial grants for travel from UNESCO or any other organization.

Discussion.—No effort was made to create a large attendance. Professor Brull wisely limited the number of papers on the program to 43, explaining regretfully that time did not permit many others who wished to present their work to do so. The principle was to promote discussion of as many selected papers as could be presented within 3 days by all attending the conference acting together.

Arteriosclerosis

DUGUID, J. B.: Department of Pathology, Royal Victoria Infirmary, University of Durham, Newcastle upon-Tyne. The pathogenesis of arteriosclerosis.

GEIRINGER, E.: Usher Institute, University of Edinburgh. Arteriosclerosis as a phenomenom of pure ageing.

COPPO, M.: Direttore Istituto Pathologica Medica Universita di Modena, Modena. The pathogenesis of arteriosclerosis.

HIRSCH, S.: Université de Bruxelles, Faculté de Médecine et de Pharmacie, Brussels. Arteriosclerosis in the limits of modern gerontology.

LANSING, A. I.: Department of Anatomy, Washington University School of Medicine, St. Louis. The Role of Elastic Tissue in Human Arteriosclerosis (Read by Title).

SCARDIGLI, G., G. MININNI, and P. CAPELLI: Istituto di Clinica Medica, Florence. Associated treatment with testosterone proprionate, vitamin E, in arteriosclerosis in the rabbit.

BELTRAN-BAGUENA: Valencia. Obvious inhibitive action on experimental cholesterinic arteriosclerosis in the rabbit.

ROSKAM, J.: Clinique Médicale A., Hôpital de Bavière, Liège. Purely vegetable survival in cerebrosclerosis. Euthanasia, dysthanasia, orthothanasia.

VISCHER, A. L.: Hôpital de l'Etat à Bâle, Bâle. Report on pathological-anatomical findings of 1836 inmates of the Old Age Institution of Bâle.

ANTOGNETTI, L.: Geneva. Activity of the Institute of Medical Pathology and Clinical Methodology concerning gerontology and geriatry.

POLLAK, O. J.: Quincy City Hospital, Quincy 69, Mass. Plasmatic Dyscolloidity as cause of Atherosclerosis.

Heart, Kidney, Blood Vessels

BARBONE: Bari. Heart volume in old age.

VON ALBERTINI, A.: Histopatologisches Institut der Universität 10, Schmetzbergst, Zürich. Relation between calcified valvular stenosis and endocarditis.

GEILL, TORBEN: De Gamles By, Copenhagen. Aspects of calcification of the mitral annulus fibrosus (240 cases).

OLBRICH, O.: Park House, Sunderland. Renal function of the aged hypertensives and nephrosclerotics.

SHOCK, N. W.: United States Public Health Service, Baltimore City Hospitals, Baltimore. Age changes in renal function.

MIZZI: Bari. Capillary resistance in the aged.

PORTA, FELICE: Parma. Vascular disharmonies of the acoustic in senility.

TIZZANO, A.: Sienna. Mortality due to cardiovascular diseases.

Social Aspects

BARBERA, L.: Milan. Work and senility (with special considerations concerning women in industry).

FABRONI, S.: Montepulciano. The influence of agricultural work on premature senility in women.

AIELLO, G.: Direttore Istituto Medicina Lavoro di Siena, Rome. Medico-social problems concerning invalidity and old age.

Nutrition

SLEEWIJK, J. G.: 32, Frankeustraat, La Hague. Physiotherapy in cardiovascular diseases of old age.

VINTHER-PAULSEN, N.: De Gamles By, Copenhagen Glossitis as an indicator of nutritional deficiency in the aged.

SCARDIGLI, G., and G. MININNI: Istituto di Clinica Medica, Florence. Metabolic aspects of thrombophilic diathesia.

GIORDANO, A. AND V. CHELI: Sienna. Bone marrow and peripheral blood in senility.

NIZET, A.: Clinique Médicale B., Hôpital de Bavière, Liège. Nutrition and longevity of red blood cells.

BOURLIERE, F.: Laboratoire de Biologie médicale, Faculté de Médecine de l'Université de l'Etat à Paris, Paris. Ageing and rapidity of cicatrization in the rat.

BRULL, L.: Clinique Médicale B., Hôpital de Bavière, Liège. Organization on a strain of inbred mice of an experiment on influence of nutrition on ageing and on resistance against tuberculosis.

MORPURGO, BOSELLI, AND G. MARS: Milan. Proteinemic alterations in senility. Research using methods of colloidal lability reactions and electrophoresis.

DAMIANI: Bari. The action of Vitamin E on the aged.

GEIRINGER, E.: c/o Pr. Crew, Usher Institute, University of Edinburgh. Vitamin C and Achromotrichia.

JANSEN, B. C. B.: Netherlands Institute of Nutrition, Amsterdam Univ., Amsterdam. On the necessity of vitamin D for old rats, according to experiments of Dr. M. de Bruin.

Endocrinology

KORENCHEVSKY, V.: Gerontological Research Unit, c/o Dept. of Physiology, Oxford University, Oxford. 1) Heart lesions produced by various hormones in rats. 2) Rejuvenative or eliminative and preventive treatment of senility, as suggested by experiments on senescent rats.

PATRONO: Rome. Aging and dyshormonoses.

R. BOURG AND PUNDEL: Brussels. Study of post-menopausal vaginal smears.

CETRONI: Catania. Geriatry and Gynecology.

MIZZI: Bari. Protein modifications in elderly patients treated with testosterone.

GREPPI, E.: Direttore Clinica Medica Universita di Firenze, Florence. Menopause as point of departure of discrasic vascular plethora.

PANELLA-CASAS, M., AND MONTEYS PORTA: Servicia de Geriatría, Hospital Municipal de Nuestra Señora de la Esperanza, Barcelona. Osteoporotic senile cyphosis.

Unclassified

ALBANESE: Sienna. Teeth in senility.

TUNBRIDGE, R. E.: University of Leeds, Department of Medicine, Leeds, 2. Observations on the nature of the changes in senile skin.

CIAULA: Bari. Reactions to fatigue in the aged.

THOMAS, A.: Directeur du Centre Médico-Technique d'Awans-Bierset, Liège. The longevity of coal miners.

FIRKET, J.: Institut de Pathologie, Hôpital de Bavière, Liège. Cancers at the beginning of life and relative frequency of sarcomas according to age.

JALAVISTO, E.: Institut le Physiologie, Université de l'Etat à Helsinki, Helsinki. Influence of parental age on the expectation of life of the offspring.

WEEKERS, R.: Service d'Ophtalmologie, Hôpital de Bavière, Liège. A few quantitative notions about senescence of ocular tissues.

FERRANNINI, L.: Professore di Clinica Medica, Piazza Garibaldi 23, Bari. 1) Work in old age. 2) The activity of the Center of Medicine of old age in Bari in the field of gerontology and geriatry.

BERGAMI: Rome. Obesity and senescence.

ZIRONI, A.: Direttore Istituto Microbiologica, Universita di Milano, Milan. Physiogenesis of senescence demonstrating a personal conception.

Other business included—

July 10: Opening meeting.—Professor Brull, acting as chairman, explained that the congress could not consider all the fields of gerontology, but that its aims were to consider a few of them and to assemble a sufficient number of members to demonstrate how urgent and interesting it will be to organize gerontologic research on a larger scale and how important it is to induce nations and scientific bodies to encourage gerontologic research.

1. Officers of the present First International Congress of Gerontology were elected as follows:

Honorary Presidents:
H. Fredericq (Belgium)
H. von Euler (Sweden)
A. J. Carlson (U. S.)

President:
L. Brull (Belgium)

Vice-Presidents:
E. V. Cowdry (U. S.)
V. Korenchevsky (Great Britain)
Torben Geill (Denmark)

Secretaries:
Nathan Shock (U. S.)
P. Bourlière (France)
A. Divry (Belgium)

2. On the invitation of Dr. R. A. Moore, Dean of the School of Medicine, Washington University, it was decided to hold the Second International Congress of Gerontology in St. Louis, the end of September, 1951.

3. It was further decided that Dr. E. V. Cowdry shall be the President of this second congress.

4. Slight modifications were made in the constitution of the International Association of Gerontological Societies.

5. William M. Norcia, President of Norte Fine Pharmaceuticals, stated that he was authorized by the owners of the Carnegie Peace Foundation Building, which will be erected in New York adjacent to the United Nations Building, to offer reservation of 1000 square feet of space as a contribution of the Norte firm to the International Association. He further stated the Norte Fine Pharmaceuticals desired to offer suitable cash prizes for the best gerontologic articles by members of the Association, or their associates, as determined by a committee of the Association. Thanks were extended to Mr. Norcia for this encouraging action.

July 11: Meeting of the Governing Body consisting of one representative of each of the member societies.

1. It was decided:
   (a) that legal advice should be secured in completing the formulation of the constitution of the Association,
   (b) that this task shall be entrusted to the President, Prof. L. Brull; the Secretary,

Dr. A. Divry, and the Treasurer, Prof. P. Moureau,

(c) that this Executive Committee shall submit the revised constitution to the Governing Board,

(d) that after approval by the Governing Board this constitution shall be registered in Belgium and appropriate connections shall be made with UNESCO, UNO, and CCICMS.

2. It was decided that, until the next International Congress, the headquarters of the Association shall be in the Hôpital Bavière, Liège, and directed by the above mentioned officers.

3. The action taken at the opening meeting was sustained; the Second International Congress of Gerontology shall be held in St. Louis under the Presidency of Dr. E. V. Cowdry in the third week of September, 1951, or as soon thereafter as is feasible, and that he be given full authority to organize the congress.

4. The question was raised as to where the transactions of the congress should be published. A suggestion to establish a new journal for this purpose was not approved. The opinion was expressed that Prof. R. A. Moore, the Editor of the Journal of Gerontology, would be willing to cooperate with the Association in the publication of papers.

5. The desirability of the present First International Gerontological Congress expressing even a tentative opinion as to the 5 most important and feasible lines of investigation was stressed. This would be in effect a continuation by a larger group of the attempt to sharpen up the research programs commenced at Lord Nuffield's conference in London. After some discussion it was agreed to tackle this problem again at the general assembly the next day.

6. In consideration of his great service, Dr. V. Korenchevsky was acclaimed "Founder" of the International Association of Gerontological Societies and "Permanent Member" of its Governing Board.

July 12: General Assembly.—After much discussion of research projects in gerontology, Prof. A. J. Carlson was requested to outline in English the 5 projects at present deemed the most important and feasible. He stated that "we have now sufficient knowledge of gerontology to provide a more adequate education of the nature of man for all people and to attempt to provide a better human environment for all people. But a healthier and happier existence in the later years of man calls for immediate and prolonged research in the following fields.

1. "Senescence of the cardiovascular system (elastic tissue and cholesterol).
2. Study of osteo-articular alterations.
3. Influence of nutrition, of endo- and exogenous intoxications and of the endocrine system on ageing (to this end utilization of isotopes).
4. Ageing of the nervous sytem and of other ectodermic tissues.
5. Utilization of biological and psychological ageing tests. (It is obvious that we need better objective methods for biological and psychological ageing and that research toward this goal will be of great service in every field of gerontology)."

The wording was unanimously accepted after having been read in English and in French.

The First International Congress of Gerontology, so well conducted by President L. Brull, was then concluded. Transactions of the Congress have been published. They can be obtained by sending a postal money order for $2.00 to Professor Brull, Clinique Médicale B, Hôpital Bavière, Liège, Belgium.

Comments

These three meetings in Barcelona, London, and Liège are impressive. They show that thinking people in many lands are aware of the importance of research on the problems of aging. They are indeed of historic significance for they mark the emergence of gerontology as a science of consequence in human welfare. Late life, as well as early life, should now be considered from every angle, medical, economic, and social, and geriatrics should be developed more on a par with pediatrics. En-

couraging is the fact that these meetings sprang from "the grass roots," so to speak, without any financial bait or stimulation from the United States. Agreement was repeatedly expressed formally and informally on three points:

1. *That we already know enough about aging intelligently to take action helpful to a large part of the population.* In other words, medical, economic, and social measures, based on established facts, are overdue despite the feasibility of making a constructive beginning.

2. *That much more knowledge of fundamentals is required in order that maximum benefits may be secured.* Some of the major research projects, which are both important and feasible, were outlined. But this attempt to sharpen up the program has only been auspiciously commenced. That the Governing Body of the International Association of Gerontological Societies, representing so many nations, should feel impelled to follow the lead of Lord Nuffield's conference in this respect is a significant step in the right direction. These researches to be effective require long term and generous financial support. And the knowledge gained should be promptly utilized in practical ways. We all want human betterment to follow scientific advances as immediately as possible.

3. *That work in all of the numerous divisions of gerontology on an international basis should be encouraged and recognized as of great value.* Giving workers opportunity and high standing in the community is really the primary need. All other objectives follow if this can be accomplished. Action is required at several levels. The most obvious and cheapest is to provide a series of fellowships for younger workers, several of which should provide travel expenses. But these alone will be abortive because they are for a short time only. Those accepting them will be few unless there are further attractive opportunities if they make good. They must be enabled to see not only a beginning but also a career that appeals to them. This career must hold out the promise of reasonable security for them and their families.

Though there may be established a few gerontologic institutes, the most easily available and logical employment of gerontologists is in universities. Therefore, it would seem that the best way is to offer appointments on the regular staffs of universities in departments of biochemistry, physiology, psychology, and so on to young people interested in gerontology from these points of view. The recipients of these appointments should do research in the field of gerontology and should make their work known to students and colleagues in at least one annual lecture. They should take part in teaching and be in line with others in the departments for promotion on the basis of merit. Acceptance by the universities of subsidies for such appointments should carry the obligation of replacing the appointees with others actively advancing the science of gerontology if the original ones no longer function to this end.

In addition to the provision of fellowships and regular appointments, work on gerontology should be dignified by a series of substantial prizes for outstanding achievement. The Norte prizes, mentioned in this report, can be made pioneers in this direction.

Money is obviously essential. The need is greatest and most immediate in the countries which have suffered most in two world wars. Because the return in human welfare is so manifest, financial aid should be forthcoming. It can be expected from several sources. The Nuffield Foundation on one side of the Atlantic and the Josiah Macy, Jr. Foundation on the other have chiefly and most consistently lighted the way for other philanthropic bodies.

Other governments, measured by their ability, should follow the examples of the United States Public Health Service. The trend is for governments to give increasing medical care to veterans. Periodic medical examinations are really a measure of economy. The cost would not be materially increased if these were to include the uniform collection on a large scale of easily acquired data bearing

on the problem of aging. It is difficult to imagine any project that would constitute so potent a factor in advancing our science. On geriatricians, and other physicians, rests the obligation, which is clear to them, of explaining the problem to their patients. Industry and organized labor can take an important part to their own advantage.

Back of all this should be mobilized the force of public opinion. Unfortunately scientists have been slow to realize their duty of cooperation with the press. Representatives of the press attending the Liège Conference expressed eagerness to join hands in this endeavor. The twin fears of progressive illness and economic dependency on others, that beset so many of us, are challenging. It is the purpose of guided publicity to overcome the principal handicap in obtaining funds for gerontologic research. This is an easily appreciated phobia — a disinclination to think and to plan for inevitable decline. The public must not turn away from this task but somehow it must be persuaded to face the issue realizing how much can be done of value to all.

Note.—This account was presented at a National Conference on Aging in Washington, D. C., August 13-15, 1950. The Conference was arranged by Mr. Oscar R. Ewing, Federal Security Administrator, at the request of President Truman. It was directed by Dr. Clark Tibbitts. The conviction was repeatedly expressed at this National Conference that for the welfare of the Nation and for their own sakes, older people must be given continuing opportunities of service dignified by financial remuneration; that much can be accomplished to this end with the knowledge of gerontology now available; but that long term, well financed, research also is sorely needed in gerontology and geriatrics broadly conceived. It was agreed that this is a world problem.

In his concluding remarks, Mr. Ewing stated that the next steps will be taken at the International Congress on Aging to be held in St. Louis in September, 1951. It has now been decided to hold the Congress in the Jefferson Hotel, St. Louis, September 9-14, inclusive.

Second International Gerontological Congress

PLACE: Hotel Jefferson, St. Louis 3, Missouri.

TIME: September 9-14, inclusive, 1951.

The Council for the Coordination of International Congresses of Medical Sciences (CCI CMS) has fully approved of both the location and the time of the Second International Gerontological Congress.

SPONSORS: (1) The International Association of Gerontological Societies. President: Prof. L. Brull, Clinique Médical B, Hôpital Bavière, Liège, Belgium. The "Governing Body" of this Association is:

R. E. Tunbridge—England
M. Warren—England
W. B. Kountz—U. S.
E. V. Cowdry—U. S.
J. A. Huet—France
F. Bourlière—France
A. L. Vischer—Switzerland
J. Reiss—Portugal
E. Jalavisto—Finland
T. Geill—Denmark
M. Panella-Casas—Spain
H. von Euler—Sweden
J. G. Sleeswijk—Holland
E. Greppi—Italy
J. Fleetwood—Ireland
V. Korenchevsky—England
(Founder of the Association)

(2) The Gerontological Society, Inc. President: Dr. R. A. Moore, Washington University School of Medicine, St. Louis 10, Missouri.

(3) The American Geriatrics Society. President: Dr. Harold W. Lovell, 115 East 67 St., New York 21, New York.

COOPERATING ORGANIZATIONS:

American Association for Adult Education
American College of Physicians
American College of Surgeons
American Psychological Association
National Council on Family Relations

ADVISORY COMMITTEE:

Dr. Ernest W. Burgess—Dept. of Sociology, University of Chicago, Chicago 37, Illinois

Dr. A. J. Carlson—Dept. of Physiology, University of Chicago, Chicago 37, Illinois

Chancellor Arthur H. Compton—Washington University, St. Louis 5, Missouri

Senator T. C. Desmond—Chairman, New York State Joint Legislative Committee on Problems of Aging, 94 Broadway, Newburgh, New York

Dr. Wilma Donahue—Director, Institute for Human Adjustment, University of Michigan, Ann Arbor, Michigan

Mr. Oscar R. Ewing—Administrator, Federal Security Agency, Washington 25, D. C.

Mr. L. K. Frank—Director, Caroline Zachry Institute for Human Development, 72 Perry St., New York 14, New York

Prof. Harold R. Hall—Graduate School of Business Administration, Harvard University, Soldiers Field, Boston 63, Massachusetts

Dr. F. Fremont-Smith—Medical Director, Josiah Macy, Jr. Foundation, 565 Park Ave., New York 21, New York

Dr. A. C. Ivy—Vice President, Chicago Professional Colleges, University of Illinois, 1853 West Polk St., Chicago 12, Illinois

Dr. Harold E. Jones—Pacific Coast Representative, Social Science Research Council, University of California, Berkeley 4, California

Mrs. Robert M. Jones—Spring Apartment Hotel, Seattle 4, Washington

Mr. W. Kaempffert—Science Editor, The New York Times, Times Square, New York 18, New York

Mrs. A. D. Lasker—Chrysler Building, 405 Lexington Ave., New York, New York

Mr. C. D. Leake—Vice President, University of Texas, Medical Branch, Galveston, Texas

Dr. Frederick A. Middlebush—President, University of Missouri, Columbia, Missouri

Father P. C. Reinert—President, St. Louis University, St. Louis 3, Missouri

Dr. L. A. Scheele—Surgeon General, United States Public Health Service, Washington 25, D. C.

Dr. Robert Stecher—City Hospital, 3395 Scranton Road, Cleveland 9, Ohio

Dr. Clark Tibbitts—Director, Conference on Aging, Federal Security Agency, Washington 25, D. C.

Dr. E. R. Weidlein—Director, Mellon Institute of Industrial Research, University of Pittsburgh 13, Pennsylvania

Dr. E. Winston—Commissioner, North Carolina State Board of Public Welfare, Raleigh, North Carolina

PROGRAM: The Chairman of the Program Committee is Dr. John Esben Kirk — Director, Division of Gerontology, Washington University School of Medicine, 5600 Arsenal St., St. Louis 9, Missouri. He is also responsible for Section I of the program. The other members of the Committee direct Sections II to IV. Each sectional director works with the help of Program Advisors.

Section I—Biology and Medicine: Dr. John Esben Kirk

Advisors on:

Anatomy—Dr. Warren Andrew, Dept. of Anatomy, George Washington University School of Medicine, Washington 5, D. C.

Arteriosclerosis—Dr. O. J. Pollak, Quincy City Hospital, Quincy 69, Massachusetts

Biological Chemistry—Dr. S. M. Horvath, Dept. of Physiology, College of Medicine, State University of Iowa, Iowa City,, Iowa

Biology—Fernandus Payne, Dept of Zoology, Indiana University, Bloomington, Indiana

Cardiology—Dr. P. D. White, Massachusetts General Hospital, Boston, Massachusetts

Clinical Endocrinology—Dr. E. T. Engle, 630 West 168 Street, New York 32, New York

Cosmetology—Dr. M. Chieffi, Division of Gerontology, Washington University School of Medicine, 5600 Arsenal St., St. Louis 9, Missouri

Dentistry—Dr. L. R. Boling, Dept. of Anatomy, Washington University School of Dentistry, St. Louis 10, Missouri

Dermatology—

Gynecology—Dr. W. M. Allen, Dept. of Gynecology, Washington University School of Medicine, St. Louis 10, Missouri

Genetics & Inheritance—Dr. Madge T. Macklin, Dept. of Anatomy, University of West Ontario, London, Canada

Histology—Dr. Norman M. Sulkin, Dept. of Anatomy, St. Louis Uinversity School ot Medicine, St. Louis, Missouri

Hypertension—Dr. W. Stanley Hartroft, Banting and Best Institute, University of Toronto, 100 College St., Toronto, Canada

Internal Medicine—Dr. F. D. Zeman, 111 East 88 Street, New York, New York

Infectious Diseases—Dr. G. O. Broun, Dept. of Medicine, St. Louis University School of Medicine, 1402 South Grand Ave., St. Louis 4, Missouri

Neurology—Dr. Albert Kuntz, Dept. of Anatomy, St. Louis University School of Medicine, 1402 South Grand Avenue, St. Louis 4, Missouri

Nutrition—Dr. C. M. McCay, School of Nutrition, Cornell University, Ithaca, New York

Ophthalmology—Dr. J. S. Friedenwald, Dept. of Ophthalmology, Johns Hopkins University, Baltimore, Maryland

Otolaryngology—Dr. A. C. Furstenberg, University of Michigan School of Medicine, Ann Arbor, Michigan

Pathology—Dr. Jean Oliver, Long Island College of Medicine, Dept. of Pathology, Brooklyn, New York

Pharmacology—Dr. Arthur H. Hellbaum, Dept. of Pharmacology, University of Oklahoma, 800 N.E. 13 St., Oklahoma City, Oklahoma

Physiology—Dr. Nathan W. Shock, Dept. of Physiology, Baltimore City Hospitals, Baltimore 24, Maryland

Psychiatry—Dr. D. Ewen Cameron, Allan Memorial Institute, 1025 Pine Ave., West Montreal, Canada

Submicroscopic Structure—Dr. J. Gross, Massachusetts Institute of Technology, Cambridge 39, Massachusetts

Surgery—Dr. Robert Elman, Dept. of Surgery, Washington University School of Medicine, St. Louis 10, Missouri

Urology—Dr. Frank Hinman, Dept. of Urology, University of California Medical School, San Francisco, California

Veterinary Medicine—Dr. W. H. Feldman, Dept. of Experimental Pathology, Mayo Foundation, Rochester, Minnesota

Zoology—Dr. F. L. Hisaw, Dept. of Zoology, Harvard University, Cambridge, Massachusetts

Section II—Sociology, Psychology, Education, Religion: Dr. Robert J. Havighurst, Committee on Human Development, University of Chicago, Chicago 37, Illinois

Advisors on:

Psychology—Dr. O. J. Kaplan, Dept. of Psychology, San Diego State College, San Diego, California

Recreation—Dr. Peter Tarrell, Director, Golden Age Program, Jewish Community Centers of Chicago, 3500 Douglas Blvd., Chicago 23, Illinois

Education—Dr. Wilma Donahue, Institute for Human Adjustment, University of Michigan, Ann Arbor, Michigan

Religious Programs and Services—Dr. Karl P. Meister, Executive Secretary, Board of Hospitals and Homes of the Methodist Church, 740 Rush St., Chicago 11, Illinois

Community Centers—Miss Margaret W. Wagner, The Benjamin Rose Institute, 1010 Rose Building, Cleveland 15, Ohio

Family Life—Dr. Frank J. Hertel, Director, Family Service Association of America, 192 Lexington Ave., New York 16, New York

Old Age Guidance—Dr. Raymond G. Kuhlen, Dept. of Educational Psychology, Syracuse University, Syracuse 10, New York

Section III—Economics and Welfare: Dr. Edwin E. Witte, Dept. of Economics, University of Wisconsin, Madison, Wisconsin

Advisors on:

Population—

Migration of Older People—Dr. Warren Thompson, Director, Scripps Foundation for Research in Population Problems, Miami University, Oxford, Ohio

Significance of Aging on Economy—

Older People in the Labor Force—Dr. Ewan Clague, Commissioner of Labor Statistics, U. S. Department of Labor, Washington 25, D. C.

Pension and Retirement Policy Systems—Mr. John J. Corson, Assistant Business Manager, Washington Post, 1337 E St., N.W., Washington, D. C.

Federal and State Assistance Program—Mr. Fred K. Hoehler, Director, Illinois State Dept. of Public Welfare, 160 N. La Salle St., Chicago 1, Illinois

Section IV—Medical Services, Hygiene and Housing: Dr. Joseph W. Mountin, Associate Chief, Bureau Medical Services, U. S. Public Health Service, Washington, D. C.

Advisors on:

Personal Problems—Dr. Edward L. Bortz, 2021 West Girard Ave., Philadelphia, Pennsylvania

Mr. George St. J. Perrott, Chief, Division of Public Health Methods, U. S. Public Health Service, Washington 25, D. C.

Dr. William Malamud, Professor & Chairman, Dept. of Psychiatry, Boston University Medical School, 80 E. Concord St., Boston, Massachusetts

Organization of Health Services—Dr. Lester Breslow, Chief, Chronic Disease Service, California Dept. of Public Health, San Francisco, California

Dr. E. M. Bluestone, Director, Montefiore Hospital for Chronic Diseases, Gun Hill Road, near Jerome Avenue, New York 67, New York

Dr. C. Rufus Rorem, Executive Director, Hospital Council, Philadelphia, Pennsylvania

Health and Employment—Dr. Vlado A. Getting, Commissioner, Dept. of Health, Boston, Massachusetts
Dr. Michael M. Dacso, Director, Dept. of Physical Medicine and Rehabilitation, Goldwater Memorial Hospital, New York, New York
Mr. Harry Becker, Director, Social Security Dept., United Automobile Workers, CIO, 7930 East Jefferson Ave., Detroit 14, Michigan

Living Arrangements—Mr. Sydney L. Stolte, President, National Society of Engineers, 1437 Marshall Ave., St. Paul, Minnesota
Mrs. Eleanor Watkins, Committee on Hygiene of Housing, APHA, 321 Congress Ave., New Haven 11, Connecticut
Miss Ollie Randall, Consultant on Services for the Aged, Community Service Society, New York, New York

Those who wish to contribute papers should communicate with these sectional directors. It is expected to allow 15 to 20 minutes for the presentation of such *contributed papers.* Each section will organize one or more symposia made up of *invited papers* for which a longer time of presentation may be permitted. Another even more important function of each section is to organize one or more discussions on *problem identification,* the purpose of which is to select problems of primary importance which are also feasible from the standpoints of available personnel, technique, and equipment. The titles of *contributed* and *invited papers* should be submitted as soon as possible and not later than May 1, 1951, the former accompanied by an abstract of not more than 200 words and the latter by one not to exceed 400 words.

EXHIBITS: A feature of the Congress will be a series of *exhibits* which is now being organized by the Chairman of the Committee on Exhibits, Dr. Albert I. Lansing, Washington University School of Medicine, St. Louis 10, Missouri. The exhibits are designed to include 75 to 100 commercial, 50 to 75 scientific exhibits and a number of movies. Special attention will be paid to the proper placing of exhibits and time will be alloted for their inspection.

The deadline for the receipt of titles of exhibits together with a descriptive summary of 200 words or less is likewise May 1, 1951. This early date is necessary in order to print the program of the Congress with all abstracts and summaries in a supplementary issue of the JOURNAL OF GERONTOLOGY in ample time to give a copy to all attending the Congress when they register.

Those expecting to participate in the Congress in any way should act promptly because gerontology, thus broadly conceived, is a large subject and preference will be given to early applications. The Hotel Jefferson has reserved 490 rooms and many others will be available in nearby hotels.

Members of the Committee on Exhibits are:

Dr. W. Furness Thompson—Smith, Kline & French Laboratories, 1530 Spring Garden St., Philadelphia, Pennsylvania
Dr. Warren Andrew—Dept. of Anatomy, George Washington University School of Medicine, 1335 H St., N.W., Washington, D. C.
Dr. G. H. A. Clowes—Eli Lilly Company, Lilly Research Laboratory, Indianapolis, Indiana
Prof. P. M. Hauser—Dept. of Sociology, University of Chicago, Chicago 37, Illinois
Dr. J. Murray Steele—Goldwater Memorial Hospital, New York, New York
Dr. Dean Davies—Dept. of Medicine, Washington University School of Medicine, St. Louis 10, Missouri
Dr. Evelyn Anderson—Institute of Experimental Biology and Medicine, National Institutes of Health, Bethesda 14, Maryland
Mr. E. Walton Bobst—President, Bobst Pharmacal Co., 305 E. 47 St., New York, New York
Dr. Roy G. Hoskins—86 Varick Road, Waban 68, Massachusetts
Dr. Henry S. Simms—College of Physicians and Surgeons, 630 West 168 St., New York 32, New York
Dr. Milton Schriffrin—Hoffman LaRoche, Inc., Palmolive Building, Chicago, Illinois

LOCAL ENTERTAINMENT: This will be in charge of a committee headed by Dr. W. B. Kountz, Division of Gerontology, Washington University School of Medicine, 5600 Arsenal St., St. Louis 9, Missouri. It will include a reception, two dinners, several small gatherings, and visits

to points of interest, historical, educational, and industrial.

FINANCES: The Finance Committee is:

Dr. R. A. Moore, St. Louis—Chairman
Prof. L. Brull, Liège, Belgium
Mr. H. I. Young, St. Louis
Prof. F. Bourlière, Paris, France
Dr. V. Korenchevsky, Oxford, England

The chief expenses will be for travel of delegates from abroad, about $60,000; and for running the Congress, about $40,000. The Department of State has agreed to send to American Missions abroad a list of those attending the Congress so that their travel arrangements may be facilitated.

It is expected to obtain contributions from philanthropic foundations, commercial organizations, and private citizens. In addition, an attendance fee of $10.00 will be charged. The attendance will probably exceed 1,000.

Contributions will be received by the Treasurer of the Congress, Mr. E. S. Jones, of the First National Bank in St. Louis, and accounts will be audited by Price, Waterhouse & Company.

PUBLICITY: The Publicity Committee, still to be selected, will consist of a medical representative, a socio-economic representative, and officers of the Press and Radio.

DIRECTION: This will be the responsibility of an Executive Committee consisting of Dr. E. V. Cowdry, the President of the Congress, and the Chairmen of the Committees.

CONTINUITY: This Second International Gerontological Congress is a continuation of the First International Gerontological Congress at Liège, Belgium, June 9-12, 1950. The attendance was 95 and included 14 nations. It was held entirely on the initiative and at the expense of Europeans and is evidence of the feeling abroad that the problems of aging are of great importance medically, sociologically, and economically.

It is also a continuation, on an international basis, of the National Conference on Aging of the Federal Security Agency in Washington, D. C., August 13-15, 1950. This was an expression of the very great interest of the American people in the same problems of aging. In concluding this National Conference, Federal Security Administrator Oscar R. Ewing said that the next steps would be taken at this Second International Gerontological Congress in St. Louis next year.

The opinion was expressed, both at Liège and at Washington, that we are dilatory in the proper utilization of present knowledge of gerontology and that more information is also needed for the benefit of a very large part of the population. This Second Congress is designed to help and to bring the nations together for the benefit of all.

December 19, 1950

GERONTOLOGIC REVIEWS

GOVERNMENT-SUPPORTED RESEARCH IN GERONTOLOGY IN PRIVATE INSTITUTIONS

HENRY S. SIMMS

(Presented at the National Conference on Aging, Washington, D. C., August 13-15, 1950)

The United States Government is granting about $25,000,000 a year to private institutions for the support of research on medical and allied problems.

These grants are made through the following five agencies: (1) the Army (with a budget of $2,000,000); (2) the Office of Naval Research, Biosciences Division (with a budget of $2,000,000); (3) the Atomic Energy Commission ($5,465,324); (4) the U. S. Public Health Service ($10,384,000 exclusive of cancer, plus $2,600,000 for cancer); and the Veterans Administration ($2,500,000).

The field of gerontology is not entered into under the extramural grants of either the Army or the Veterans Administration. The Navy has three small grants for projects related to aging. The Atomic Energy Commission has two grants of $100,000 each, and one of about $300,000, all for life-time studies of animals subjected to irradiation or to administration of radioactive isotopes.

However, the major portion of the gerontological research grants come from the National Institutes of Health. In addition to its main research grants budget, the National Institutes of Health make grants under budgets of the National Heart Institute, the National Institute of Mental Health, and the National Institute for Dental Research (as well as the National Cancer Institute).

The National Institutes of Health have established a Gerontology Advisory Committee.

SUMMARY OF U. S. GOVERNMENT-SUPPORTED EXTRA-MURAL RESEARCH IN MEDICAL AND ALLIED FIELDS (1949—1950)

	Total Extra-Mural Budget	Grants for Gerontological Research		%
		On Basic Problems of Senescence	On Diseases of Older People[1]	
Department of the Army	$2,000,000	0	0	0
Office of Naval Research Biosciences Division	2,000,000	17,000	0	1
Atomic Energy Commission	5,465,324	494,000	0	9
U. S. Public Health Service: exclusive of Cancer (including Heart, Mental, and Dental)	10,384,000	(350,000)[2]	(2,300,000)[2]	26[2]
National Cancer Institute	2,600,000	0[1]	0[1]	0[1]
Veterans Administration	2,500,000	0	0	0
Totals	$24,949,324	$861,000[2]	$2,300,000[2]	13

[1] Cancer has not been included as a gerontological problem.

[2] Rough estimate based on a survey made by the Gerontology Advisory Committee of the National Institutes of Health for the calendar year 1950.

This Committee is an outgrowth of the former Gerontology Study Section. Its duties are to survey the research that is related to gerontology, to make suitable appraisals and recommendations, and to implement the establishment of new research projects in this field.

At the present time, the Gerontology Advisory Committee is engaged in going over all the applications that are submitted to the National Institutes of Health in order to select those having a bearing on gerontology. A rough estimate would place the total grants related to gerontology in 1949-1950 at about 26 per cent of the total research grants budget.

The Gerontology Advisory Committee classifies the research projects according to the problems involved. There are nine main categories of problems related to the basic process of senescence. There are fourteen disease categories dealing with diseases of later life. Nine of these are cardiovascular-renal and five deal with other diseases (including mental diseases).

CLASSIFICATION OF GERONTOLOGICAL RESEARCH PROBLEMS

SENESCENCE—Problems which, in general, require comparison between adults of different ages.	DISEASES—Problems not necessarily requiring age comparisons.
1. Increased mortality and morbidity.	11. Arteriosclerosis.
2. Changes in normal requirements: 2a. Dietary, 2b. Therapeutic, 2c. Other.	12. Angina pectoris, coronary occlusion, and myocardial degeneration. 13. Congestive heart failure. 14. Cardiovascular edema.
3. Altered response to abnormal conditions: 3a. Reaction to stress, 3b. Recovery from physical injury or operation, 3c. Response to other conditions.	15. Hypertension. 16. Cerebral hemorrhage. 17. Chronic and arteriosclerotic nephritis.
4. Loss of physical ability.	18a. Cardiorespiratory. 18. Other C. V. R. problems and diseases.
5. Loss of mental ability.	
6. Structural changes: 6a. Chemical composition, 6b. Histologic or anatomic, 6c. Physical properties.	19. Cirrhosis. 20. Arthritis and rheumatism. 21. Osteoporosis. 22. Senile mental diseases. 23. Other diseases and geriatric problems.
7. Functional changes: 7a. Chemical or metabolic, 7b. Synthesis, secretion, excretion, or deposition, 7c. Physiologic.	30. Unclassified problems.
8. Personal adjustment: 8a. Economic, 8b. Social.	40. Research dealing with *approaches* rather than problems. 40a. Animal colonies.
9. Other senescence studies.	

GOVERNMENT-CONDUCTED RESEARCH IN GERONTOLOGY

NATHAN W. SHOCK AND ANNABEL WEHRWEIN

(Presented at the National Conference on Aging, Washington, D. C., August 13-15, 1950)

At the request of the Planning Committee of Section IA (Research) of the National Conference on Aging, a survey of research on aging being carried out by agencies of the Federal Government was made. A total of 31 divisions and bureaus in 14 agencies was canvassed, either by telephone or personal contact. Of these, 17 reported studies that could be classified as having a bearing on the field of gerontology. While some of the projects can be specifically classified as aging research, for the most part the observations on aging are incidental to the investigation of some other problem.

The findings in this survey can best be broken into three fields: research on the aging of materials, of animals, and of man. Two Federal agencies are conducting research on the aging of materials. In the Department of Commerce, the Bureau of Standards is investigating the deterioration and aging of textiles and cellulose products, the mildewing of leather, and the effects of weathering on materials. The Forest Service of the Department of Agriculture is conducting research on the aging of wood and wood products in the Forest Products Laboratory in Madison, Wisconsin.

Animal studies are being carried out in four agencies. A ten year study of the effects of radiation on mouse genetics is under way at the Oak Ridge laboratories of the Atomic Energy Commission. While this project is only in its first year, the investigators believe that the results will show a significant reduction in the life span of the mice. In the Department of the Interior, Fish and Wildlife personnel are observing the longevity of animal populations through the banding and marking of birds, fish, and game animals. The Division of Animal Industry, Department of Agriculture, reported that they are mainly interested in young animals since there is a decrease in productivity as age increases. This division has, however, issued several publications on the work performance of horses and the determination of the age of horses by their teeth. The influence of the endocrine glands on gray hair in rats caused by pantothenic acid deficiency is under investigation at the Experimental Biology and Medicine Institute of the Public Health Service, Federal Security Agency. Copper deficiencies have also been shown to produce gray hair in these studies.

Research on aging of the human animal, being carried out by Federal agencies, encompasses the socio-economic fields as well as the medical. In the economic sphere the problems of the older worker are being considered by the Department of Labor, in two of its divisions. The Bureau of Labor Statistics is working on a study of the problems of the older worker in connection with the research needs of the Bureau. This Bureau has also prepared a study on the working life-time of men in the labor force and plans to do a similar study on the working life-time of women. A five-office study on the impact on the older worker seeking a new job is under way in the Office of Employment Security.

In the Federal Security Agency, the Social Security Administration is continually carrying out projects of a statistical nature on population studies, labor force, income distribution, retirement, economic status, and so forth, in connection with the work of the Old Age Assistance and Old Age and Survivors Insurance programs.

Further studies in the socio-economic field are being conducted by the Federal Personnel Council of the Civil Service Commission. A special subcommittee is considering the total problem of the increasing age of the popula-

tion as it affects the total federal employee group. The committee is also analyzing the age distribution of the people under Civil Service and the implications of this to the Government.

The Office of Vocational Rehabilitation, Federal Security Agency, reports no specific research on aging other than a study of the characteristics of persons 45 and over who have been rehabilitated. This study has been published.

In the field of health needs, the Division of Home Economics of the Department of Agriculture has recently issued a publication on nutrition for older people, including basic food plans, and suggestions of what to eat and what not to eat. This pamphlet is based on studies made on food preferences and uses of older people, and a compilation of other writings in the field of nutrition. The National Cancer Institute of the Public Health Service, Federal Security Agency, announces the recent development of a method for producing large quantities of pure amino acids for use in studies of the chemical processes of nutrition in cancer patients. This discovery will greatly facilitate treatment of protein deficiency states associated with the diminishing ability of the aged to utilize food. While none of the research being carried out by the Veteran's Administration specifically points up age, studies are being conducted in two of the domicilary homes in Bath, New York, and Los Angeles, to analyze the problems and health needs of the residents.

Studies of heart disease in aeronautic personnel whose positions require high physical standards are being undertaken by the Medical Division of the Civil Aeronautics Administration. The study is being made on two age groups, those under 40 and those over 40. The Department of the Army is conducting a program of recognition and detection of premature senility in young men in the course of selection and assignment of senior officers. This program is being carried out through screening physical examinations and psychiatric tests.

The consideration of housing for the aged is one of the most important problems facing this group, yet no research in this field was uncovered in the survey of Federal Agencies. The Housing and Home Finance Agency expressed a very great interest in the problem, but has neither the funds nor personnel to undertake any projects at this time. One other agency, the Bureau of Indian Affairs of the Department of the Interior, expressed a desire to cooperate with any agency wishing to make studies on the Indian populations, but again the Bureau lacks funds and personnel to do any research itself.

Because the Section on Gerontology of the National Heart Institute, Federal Security Agency, represents the most comprehensive program of aging research being conducted in the Federal Government, comments on this Section are being given in greater detail. The Section on Gerontology, which operates within the framework of the Baltimore City Hospitals, was established in 1940 under a grant from the Josiah Macy, Jr. Foundation to the Public Health Service, under the direction of Doctor Edward Steiglitz. In 1941 the support of the Section was assumed by the National Institutes of Health and Doctor Nathan W. Shock was asked to take over the direction of the program after Doctor Steiglitz returned to private practice. The first studies undertaken were on the functional relationship of the kidney. During the war years aging research as such was discontinued, but the laboratory continued to operate, doing other war research projects. Following the war in 1946 the laboratory returned to aging research and the program of the Section was greatly expanded. The Hospital made available one wing of the Chronic building and provided the funds for remodeling the space into seven chemistry and physiologic laboratories. At this time the research staff of the Section was increased and studies on age changes in renal function were continued.

The research program of the Section continued to expand and in 1947 the Hospital turned over another wing with 20 beds, to which patients from either the Infirmary (Old

People's Home) or other acute wards could be transferred for study. At the completion of any study such patients could be transferred back to the ward from which they came; thus the research beds could be maintained in a fluid state at all times.

With the establishment of the National Heart Institute in 1948, the Section on Gerontology was transferred from the Experimental Biology and Medicine Institute to this newly formed branch of the National Institutes of Health. The research program has been continually developing, calling for further expansion of facilities. The City Hospitals again responded and turned over two entire wings of the Chronic Hospital for the use of the Section. Work has just been completed on the remodeling of the first floor into testing laboratories and space for the experimental program. The second floor is given over to a 60 bed ward, of which about 45 beds are in operation.

The experimental program of the Gerontology Section consists of three major divisions: one on the general biochemistry and metabolic processes in aging; the second on cardiovascular and renal problems in aging; and the third on studies in changes in intellectual capacities in older people.

In all of these studies an attempt has been made to obtain evidence on as nearly normal old people as possible. The primary problem has been a description of the changes that occur in people as free of disease as possible. Arrangements have been made with the City Hospital to use ambulatory older people who live in the Infirmary on the hospital grounds. In addition the Unit serves as the admitting ward for all new admissions to the infirmary, so that all individuals who come in for custodial care are available for study.

From the National Heart Institute, the National Institutes of Health and the Baltimore City Hospitals, Baltimore, Maryland.

UNIVERSITY-SPONSORED RESEARCH IN GERONTOLOGY

JOHN ESBEN KIRK

(Presented at the National Conference on Aging, Washington, D. C., August 13-15, 1950)

In connection with the National Conference on Aging held in Washington, D. C., August 13-15, 1950, this survey was presented at the invitation of Mr. Oscar R. Ewing, Federal Security Agency Administrator. The review represents a summary of university sponsored research work in gerontology in the United States and Canada.

The survey consists of two sections. The first part is concerned with a summary of gerontologic research work published during the five year period July 1, 1945, to July 1, 1950. The second part of the review includes gerontologic investigations which at the moment are being performed or which are planned to be undertaken in the near future by American and Canadian universities.

In the presentation of these surveys an attempt has been made to delimit the field so as, on the whole, to include only such studies which have a direct relation to gerontology and geriatrics. In this connection it should be mentioned that investigations pertaining to cancer and to psychologic aspects of aging have not been considered. Some overlapping of the field covered in this report and the subjects covered by other participants in the Conference can hardly be avoided since in several instances partial financial aid from government funds has been given to university sponsored research.

Concerning the first part of the survey, university publications on gerontologic subjects from the period July, 1945, to July, 1950, the listing of papers has been based on the Current List of Medical Literature issued by the Army Medical Library. The titles of the publications in American and Canadian scien-

tific and medical journals have been surveyed for the five year period. Should some important papers have been missed, the chief reason would be that the gerontologic character of the publication was not evident from the title.

As will be seen from table 1, a total of 127 papers dealing with university sponsored gerontologic research was obtained from the review of the medical literature. The table shows the geographic distribution of these publications. As also will be seen from the table, the subjects may conveniently be subdivided under 8 subheadings, each of which groups will be considered briefly.

Seventeen of the papers from the five year period deal with anatomic changes of cells and organs. One of these investigations is concerned with the size of chromosomes in young and old rat cells, whereas the remaining 16 publications deal with more general organ studies. The organs investigated have been the salivary glands, mammary gland, adrenal, testis, ovary, pituitary, spleen, lymph glands, heart, lung, brain, and skin.

Thirteen publications from this period deal with chemical changes of tissues and blood in relation to aging. Of the papers included in this group the most important are probably the publications by Lowry, Hastings, and McCay and by Barlow and associates dealing with the electrolyte and water content of aged tissues and the investigations by Lansing on the calcium content and the calcium binding of old cells. In addition several papers have been published on the concentration of the individual phosphorus compounds in the myocardium and

TABLE 1. SURVEY OF UNIVERSITY SPONSORED PUBLICATIONS IN GERONTOLOGY—JULY 1, 1945, TO JULY 1, 1950.

United States and Canada	Anatomic Changes of Cells and Organs	Chemical Changes of Tissues and Blood	Organ Functions	Hormones	Nutrition	Arteriosclerosis (and arterial metabolism)	Clinical Studies	Miscellaneous
Alabama	—	—	—	—	1	—	—	—
California	1	—	1	—	—	11	—	—
Connecticut	1	—	—	—	—	2	—	1
District of Columbia	3	—	—	—	—	—	—	2
Illinois	—	—	—	—	2	3	—	—
Indiana	1	—	—	—	—	—	—	—
Louisiana	—	—	—	—	—	1	—	—
Maryland	—	—	1	—	—	—	—	1
Massachusetts	—	3	—	2	—	1	1	1
Minnesota	—	—	2	—	1	—	1	—
Missouri	5	6	3	6	6	6	2	2
New Jersey	1	—	—	—	—	—	—	—
New York	1	1	1	2	5	11	—	1
North Carolina	—	—	—	—	—	—	—	1
Ohio	1	—	—	—	1	1	—	—
Oregon	—	—	—	—	—	1	—	—
Pennsylvania	1	—	—	—	1	1	—	—
Texas	1	2	—	—	—	—	—	—
Virginia	1	—	—	—	—	—	—	—
Wisconsin	—	—	—	—	1	—	—	—
Canada	—	1	2	1	—	7	—	—
Totals	17	13	10	11	18	45	4	9

skeletal muscles of young and old animals. Three of the papers in this subgroup deal with age changes in the concentration of various constituents of plasma. These latter studies include observations on protein-bound iodine, silica, and individual amino acids.

The university sponsored investigations on the effect of age on organ functions and on tissue metabolism are not very numerous; only 10 publications in this important field have appeared in the five year period. The investigations performed on animals deal with blood pressure changes with age in dogs and with the effect of age on the carbohydrate metabolism of homogenates prepared from various tissues. In human individuals observations have been made on the effect of aging on respiratory functions, blood volume, hippuric acid synthesis, skin elasticity, skin lipid secretion, and the concentration of acid phosphatase in the prostatic secretion.

The hormonal aspects of senescence have quite naturally received some attention during the past five years. Of the 11 publications in this field, 3 deal with the urinary excretion of 17-ketosteroids and corticoids in old age, and 1 with the thyroid function of aged individuals as measured by the uptake of radioactive iodine by the thyroid gland. In one investigation the effect of mild hyperthyroidism on egg production in the fowl has been studied.

Considerable interest has also been attached to the effect of hormone administration to old individuals. Thus long term studies have been undertaken in which menstruation has been brought about in 70 to 90 year old women through treatment with estrogenic preparations, whereas other studies deal with the effect of sex hormones on the mucous membrane of the nose, the elasticity of the skin, the growth of the beard, and the acid phosphatase production of the prostate gland.

One field of gerontology which has received much attention in university sponsored research during the five year period is the nutritional aspects of aging, which has been the subject of 18 publications. Some of these studies represent continuations and extensions of the very important observations on the effect of dietary restriction on longevity initiated by McCay in the 1920s. Besides the studies by McCay and his associates, this aspect of gerontology has been investigated by Carlson, Elvehjem, Saxton, and their associates. Other studies by the same investigators deal with the effect of vegetarian diet, of bulk formers, and of coffee on the longevity of rats.

The problem of nitrogen balance in old persons has been studied by Kountz, and the calcium balance in old animals has been investigated by McCay and his associates.

The remaining papers in this subgroup deal with quantitative aspects of vitamin nutrition in the aged.

The greatest efforts in gerontologic research in the period 1945 to 1950 have been directed towards the study of arteriosclerosis. The last five years have seen not less than 45 papers published from university laboratories and divisions, and some of the most important contributions are included among these investigations. The subject of experimental arteriosclerosis and of arteriosclerosis in human individuals has been approached in such a variety of ways that a large volume of facts has been collected. Of special importance are the studies by Bloch on the intermediary cholesterol metabolism, the observations by Gofman and his associates on the lipoprotein fractions in serum, and the studies by Simms on lipfanogens.

Three of the papers contained in this subgroup deal with the metabolism of normal arterial tissue. Although these studies cannot be considered in the strictest sense as belonging to gerontologic research, the publications have been included since it seems likely that information on the normal metabolism of the arterial wall may become of importance for the future study of the etiology of arteriosclerosis.

In the next subgroup is listed such research work which directly deals with clinical gerontologic aspects. It will be understood that papers which only incidentally refer to clinical problems in the aged have not been included. One of these 4 papers, the study by Albright

on senile osteoporosis, would seem to have enlarged our knowledge of this important senile condition to a considerable extent.

In the last subgroup 9 investigations have been listed which do not naturally fall under the previous headings. Three of these papers deal with the resistance of old animals to various poisons, and 2 studies are concerned with the anatomic and pathologic factors in senile alopecia.

As mentioned in the introduction, the second part of the survey of university sponsored research work in gerontology deals with studies which are either in progress or which are planned to be started in the near future.

For preparation of this survey letters of inquiry were sent in the beginning of July, 1950, to 333 American and 53 Canadian university departments and divisions. Among these 386 university units were 60 departments of anatomy, 78 departments of biology and biochemistry, 67 departments of physiology, 56 departments of pathology, 67 departments of medicine, and 58 departments of zoology. A total of 175 replies were received, which represents a return of 47 per cent.

On the basis of these replies, supplemented by information obtained from the programs for the forthcoming meetings of the Gerontological Society and the American Society for the Study of Arteriosclerosis, it has been

TABLE 2. SURVEY OF CURRENT UNIVERSITY SPONSORED RESEARCH WORK IN GERONTOLOGY.

United States and Canada	Anatomic Changes of Cells and Organs	Chemical Changes of Tissues and Blood	Organ Functions	Hormones	Nutrition	Arteriosclerosis (and arterial metabolism)	Clinical Studies	Miscellaneous
California	5	—	—	—	1	2	—	—
Connecticut	—	—	—	—	—	—	—	1
District of Columbia	5	—	1	—	—	—	—	1
Illinois	—	—	—	1	1	4	—	—
Indiana	—	—	—	1	—	—	—	—
Iowa	1	—	—	—	—	—	—	1
Kansas	—	—	—	—	—	1	—	2
Kentucky	1	—	—	—	—	1	—	—
Louisiana	—	—	—	—	—	—	—	1
Michigan	—	2	—	1	—	—	—	—
Minnesota	—	—	—	—	—	1	—	—
Missouri	5	1	4	2	6	10	2	4
Nebraska	1	1	1	—	—	—	—	1
New York	—	1	—	5	1	2	—	—
Ohio	1	5	—	2	2	—	1	—
Oklahoma	3	—	—	1	—	2	1	—
Oregon	1	—	1	—	—	—	—	—
Pennsylvania	1	—	—	—	—	6	—	—
Rhode Island	1	—	—	—	—	—	—	—
South Dakota	4	—	—	—	—	—	—	—
Utah	1	1	2	1	—	1	—	—
Virginia	—	—	—	—	—	1	—	—
Wisconsin	3	1	—	—	—	2	—	—
Canada	3	2	2	1	—	6	—	—
Totals	36	14	11	15	11	39	4	11

possible to compose a list of 141 projects. The distribution of the topics in the various categories of research and the geographic distribution of the activities is shown in table 2.

Of the 36 projects included in the field of anatomic research, 5 deal with nuclear, mitochondrial, or pigment changes in the cells with age and 5 with age changes in connective tissue and connective tissue ground substance. Five investigations are concerned with age changes in reproductive and endocrine glands, 4 with changes in the skeleton and the joints, 3 each with changes in the skin and in the heart, and 2 each with the effect of age on the histology of the nervous system and the kidneys.

The remaining subjects include observations on age changes in the ear, variations with age in the smooth muscle content of the human colon, and general organ changes.

The research on chemical changes of the tissues and blood with age is represented by 14 subjects, prominent among which is a series on the chemistry of connective tissue with aging. This series includes investigations on the amino acid composition of collagen and elastin, on the behavior of collagen towards proteolytic enzymes, and studies on the type of peptide bonds in old connective tissue.

A total of 11 research problems deal with alterations of organ functions with age in human individuals and in animals. This subgroup includes lung volume studies in old subjects, investigations on the effect of age on the elasticity of the skin, and studies on cerebral metabolism in elderly persons. Other projects deal with measurement of hearing, visual acuity and visual accommodation in various age groups, and the secretion of acid in old animals.

The investigations listed under the heading hormonal studies comprise a total of 15 projects, all of which deal with the effect of age on the steroid metabolism and with observations on various effects of hormone administration to elderly individuals.

The nutritional studies included in the current or planned gerontologic university sponsored research comprise 11 projects. Of these, 3 investigations are in the field of longevity studies on rats on various diets, 2 projects deal with nitrogen balance observations in elderly patients, and 1 with calcium balance studies in old men and women. The remaining investigations in this subgroup are concerned with quantitative observations on vitamin nutrition in old age.

The activities concerned with the various aspects of arteriosclerosis include not less than 39 studies, a number which gives a strong indication of the lively interest in this field at present.

As would be expected, a fairly large number of these projects are planned along the same lines as the research work from the period 1945 to 1950 and have the character of confirmatory studies or investigations dealing with special aspects of previously established results. It should be mentioned that 3 of the projects are planned to investigate the ultracentrifuge pattern of the plasma lipoproteins according to the method employed by Gofman, whereas 7 studies deal with the enzymes and the metabolism of the arterial wall.

As was the case with the research work published during the period 1945 to 1950, studies primarily concerned with the clinical aspects of gerontology are rather few, only 4 being listed in the present survey. The topics include investigations on proved cases of hypovitaminosis A and B_1, osteoporosis, and senile emphysema and asthma.

Under the heading of miscellaneous studies are finally included 11 projects, 2 of which deal with the effect of experimental exposure of old individuals to heat and to cold and 2 with observations on tissue repair and skin transplantation in old individuals and animals. One study is devoted to an examination of the urinary sediment count in old age.

It will be seen from this brief survey that the research fields in gerontology which at present command the greatest activity are anatomy and investigations pertaining to experimental arteriosclerosis, but that hormonal and nutritional problems also are receiving consid-

erable attention. On the other hand, investigations directly concerned with the mechanism of cellular aging and controlled studies on the clinical aspects of disease in the elderly continue to be rather few. It is noteworthy that two new fields are receiving increasing emphasis, namely studies dealing with the metabolism of arterial tissue and investigations on the submicroscopic structure of aging tissues, the latter line of research being made possible through the introduction of the electron microscope. It seems reasonable to expect a further development in these fields in the near future.

The accumulated list of 141 projects, many of which are already under investigation and nearing completion, gives a strong impression of a considerable activity in gerontologic research and emphasizes the great interest paid by American and Canadian universities to this subdivision of medicine and science.

From the Division of Gerontology, Washington University School of Medicine, St. Louis 10, Missouri.

BOOK REVIEWS

RECOMMENDATIONS ON AGING PROBLEMS

YOUNG AT ANY AGE, New York State Joint Legislative Committee on Problems of the Aging, Legislative Document No. 12, 1950, 192 pages, paper bound. (Free copies of the report are available from Senator Thomas C. Desmond, Chairman, New York State Joint Legislative Committee on Problems of Aging, 94 Broadway, Newburgh, New York.)

This is no ordinary government report. It is a fascinating document, attractively presented, well illustrated with pictures and diagrams, and understandable to any lay reader. The cover, which is extremely attractive, presents a picture of an aged gentleman at a work bench—actually good enough for framing.

Only about 50 pages of the volume represent the formal report of the committee itself and even this is done in an informal readable style. The rest of the material includes 33 short two or three page items written by some of the leading experts in the country. These statements include, for example, an article by Dr. Leonard A. Scheele on "Public Health and Our Older People," one by Dr. E. M. Bluestone on "Medical Care for Prolonged Illness," one by Miss Jane M. Hoey on "Trends in Old Age Assistance," one by Robert C. Goodwin on "Employment of Our Elderly," and others on almost all aspects of the problem. A half dozen of the items are concerned with the New York State situation itself and included are several statements of what certain local communities are doing for their elderly citizens.

As to the report and recommendations of the committee itself, there seem to be several major emphases: 1) all agencies and groups, public and private, federal, state and local, must participate, 2) the emphasis must be on the local community and on local community initiative and participation, 3) older people can produce and work in many instances and must not automatically be put on the shelf. A blueprint of the so-called New York State Plan for the aging is illustrated in a special chart showing at the head a state council on the aging which would have the function of providing the leadership coordination. The groups that are mentioned as having a specific part to play in the total program include those interested in labor, safety, welfare, education, health, conservation, commerce, civil service, mental hygiene, and housing.

The report includes valuable information and data without the usual uninteresting statistical tables. An arresting item is the one which shows that in 1850 there were 17.3 persons age 20 to 64 for each person age 65 and over, whereas in 1950 there were 7.7 persons age 20 to 64 for each person age 65 and over. It is estimated that by the year 2000 A.D. there will be only 4.6 persons from 20 to 64 for each person 65 and over. This, of course, points up the need of keeping as many as possible of our aged at productive labor.

The report contains numerous findings and recommendations running the gamut of all phases of the problems of aging. It would be unfair to cite examples of the recommendations as they would be unrepresentative, but typical of the suggestions made are one for state grants-in-aid for recreational programs sponsored by local communities, one urging the "State Education Department to reexamine its own discriminatory policy regarding older persons," one urging the establishing of geriatric clinics, and one calling for library facilities which would more specifically meet the needs of the aged.

The State of New York is taking genuine leadership in promoting plans to meet the developing problems relating to the aged; and

the legislative committee, including the staff and advisory committees, are to be congratulated for publishing a volume which presents a rounded view of the total problem, recommendations for doing something about it, and for presenting the matter in such a way as to make very pleasant reading. The entire tone of the volume is constructive and foresighted.

With intelligent planning it will be possible for most people to be "young at any age."

B. E. YOUNGDAHL

NURSING CARE OF THE AGED

GERIATRIC NURSING, Kathleen Newton, C. V. Mosby Co., St. Louis, 1950. 420 pages, $4.50.

In this pioneer work on the nursing care of the aged, Miss Newton, who is in charge of graduate nurse education at the Cornell University—New York Hospital School of Nursing, has scored a real historical "first." More importantly, she has made a significant contribution to nursing education and to the welfare of the aged. In a sense, her work crystallizes the growing interest of leading professional nurses in the medical and social problems of old age, as has been evident for the past five years in the far-sighted planning of the Department of Nursing Education, Teachers College, Columbia University.

In its basic concepts and construction this books reveals the sound principles of present day nursing education. The second chapter is devoted to patient-nurse relations, emphasizing the importance of the nurse's attitudes and the peculiarities of the elderly patient's reactions. The next chapter of this first section on general background is concerned with basic socio-psychologic needs, while the third deals with employment and economic security. A chapter on housing in health and during illness makes certain that the nurse is aware of her patient in relation to self, to family, and to environment.

The second section, occupying two chapters, is entitled "Non-specific Considerations," under which are discussed general hygiene and nutrition. The balance of the book, comprising fourteen chapters, is devoted to the many aspects of clinical nursing, among which we find special treatments, anesthesia and operative care, as well as nursing in gastro-intestinal diseases, in cardiovascular renal diseases, in diabetes mellitus, in psychiatric disturbances, and in various other medical and surgical specialties. Since this work was written for the graduate nurse, Miss Newton has been able to proceed to the heart of each problem without bothering to dwell upon elementary considerations. Throughout the practical side of nursing is strongly emphasized.

The book shows genuine concern for the well being of older people and a sincere sympathy with their difficulties. It should go a long way toward breaking down the emotional barriers that prevent some professional nurses from realizing the satisfaction to be achieved in caring for the old. Miss Newton shows a wide familiarity with recent medical and social literature, each chapter being followed by a list of references. The illustrations are few but well chosen and really enhance the text.

This reviewer's only regret about Miss Newton's excellent book is based on commercial rather than professional considerations. The title "Geriatric Nursing" will not be self-explanatory to nurses for the same reason that the word "geriatrics" itself is still not familiar to many physicians. A sub-title, such as "Nursing Care of the Aged," would be helpful. Indeed, it might well be made the full title and leave no question in the mind of the prospective purchaser.

F. D. ZEMAN

STUDIES ON AGING

CONFERENCE ON PROBLEMS OF AGING, Transactions of Tenth and Eleventh Conferences, edited by N. W. Shock, Josiah Macy, Jr. Foundation, New York, 1950, 258 pages, paper bound, $3.75.

This volume combines the proceedings of the Tenth and Eleventh Conferences on Aging, February 9-10, 1948, and April 25-26, 1949, sponsored as in the past by the Josiah Macy, Jr., Foundation. Many distinguished investigators participated in these meetings and their contributions have been edited into easily readable form by Dr. N. W. Shock.

Of particular interest to this reviewer was Dr. E. V. Cowdry's preface which traces the historical development of the Foundation's participation in the problems of aging beginning as far back as 1933 with the publication of the volume on Arteriosclerosis, edited by Dr. Cowdry himself. Originally called the Club for Research on Ageing the name has now been changed to the Conference on Problems of Aging to conform to the Macy Foundation's Conference Program, which is explained in a foreword by Dr. Fremont-Smith. The establishment of the *Journal of Gerontology* is an outgrowth of earlier conferences and was designed to offer a forum wherein specialists from widely varied fields could publish their work on these problems.

In the 1948 Conference we find studies on the regeneration of the liver by Dr. J. C. Aub, on the investigation of sexual regeneration in elderly women by Drs. W. M. Allen and W. H. Masters, on the problems encountered in an old age counselling center by Dr. K. Stern, on a longitudinal study of aging by Dr. L. W. Sontag, and on problems connected with the age of retirement by Dr. C. M. McCay. Dr. Oscar Riddle reports on the Indian Science Congress, Dr. E. J. Stieglitz on gerontologic activities in the United States and abroad in 1947. Dr. H. S. Simms presents his views on what we can do to advance research in aging and Dr. Nathan Shock gives an account of the work of his group, a unit of the National Heart Institute. Dr. R. A. Moore outlines the organization and plans for research units in gerontology, emphasizing the view that geriatric and gerontology units should be set up within the framework of existing departments rather than as separate institutes.

In the 1949 Conference program the prevailing theme was longevity studies with laboratory animals. The opening address by Dr. C. M. McCay on nutritional factors is a fundamental document for all who may in the future essay investigations in this area. Dr. Robscheit-Robbins, Dr. R. S. Harris and Dr. J. A. Saxton contribute worth while papers on their work with animals.

Each individual paper is followed by stimulating discussion by the conferrees. This volume is highly recommended to all interested in gerontology, but particularly to young men seeking orientation in methods and objectives for investigative work of their own.

F. D. ZEMAN

FOOD GUIDE FOR THE ELDERLY

FOODS FOR HEALTH AS WE GROW OLDER, Nutrition Service, Community Service Society, New York City, 1949, 33 pages paper bound, 25¢.

This valuable booklet aims to guide the elderly to greater health and happiness through better nutrition. From beginning to end the practical aspects of the problem are emphasized by explaining how the right foods protect health by listing the foods that are needed daily and by discussing why these foods are important. A master meal plan is outlined and the necessary variations suggested for gaining or losing weight, for stimulating the appetite,

and for individuals who chew with difficulty. Particularly worth while is the discussion of costs when eating either at home or in restaurants. Necessary kitchen equipment is listed as are also the various ways one can manage without a refrigerator.

This compact collection of useful information was planned for the clients of the agency. It will be of greatest utility to all social workers who are concerned with the welfare of the aged since it may be given out with the full assurance that it will be understood and appreciated by both men and women, particularly those living alone in single rooms with minimal housekeeping facilities.

F. D. ZEMAN

RECENT CONTRIBUTIONS TO THE MEDICAL HISTORY OF OLD AGE

Miss S. R. Burstein of the Wellcome Historical Medical Museum, London, continues to bring her broad training in anthropology and sociology to bear on the historical aspects of old age. Her *Lillien Jane Martin—Pioneer in Old Age Rehabilitation (Medicine Illus., 4: 82-90, 153-158, 1950)* is an excellent study of the personality and life work of the great psychologist, and serves to introduce her interesting life story and her stimulating views to a larger British audience. The more one studies the varied accomplishments of this great woman, the more one becomes impressed by her rare combination of originality, courage, and teaching ability.

In *Aspects of the Psychopathology of Old Age, Revealed in Witchcraft Cases of the Sixteenth and Seventeenth Centuries (British Med. Bull., 6: 63-72, 1949)* Miss Burstein has given us a provocative answer to her own query, "why, for two and one half centuries, suspicion of, and prosecution for, witchcraft constituted a major hazard of female senescence."

In her characteristically thorough investigation of the problem the writer discusses the evidence of contemporary English, Scottish, and continental writers, stressing their opposition to the view that witches were "merely aged persons of weake braines and troubled with abundance of melancholie." She points out the characteristic psychotic behavior of the suspected old women. The case of the mother of Johan Kepler, the famous astronomer, is particularly illuminating, and the son's defence is of the greatest interest because of its frankness.

That the unfortunate old women had as their defenders many men of understanding is well documented by quotations from Webster, Burton, Weyer, and Scot. The difficult living conditions in the England of Elizabeth are particularly emphasized by the writer. "For the underlings of society—the poor, the infirm and the old—there was little joy in Elizabeth's Golden Age, the age of discovery and invention, of the rebirth of science and the revival of others."

For students who wish to pursue this fascinating inquiry further, Miss Burstein's list of over one hundred references to the literature of the subject will serve as a useful point of departure. The author's command of modern as well as older sources makes it possible for her to draw interesting parallels between the sixteenth and seventeenth centuries and the problems of our own time.

F. D. ZEMAN

MR. PUNCH CONTEMPLATES OLD AGE

Keeping up with scientific literature and current comment on the complicated problems of old age is becoming increasingly difficult. Your correspondent is indebted to Dr. Archibald Malloch, Librarian Emeritus of the New York Academy of Medicine, for two recent issues of that sturdy supercentenarian among periodicals, *Punch or the London Charivari* (June 7 and

21, 1950), in which Mr. Eric Keown discusses the care of the old.

These two articles, models of conciseness, delightfully illustrated by Mr. Norman Nedusbridge, cover first the services rendered old people in their own homes and then describe the arrangements for those in institutions. The work of the friendly visitors of a London Old People's Association is described with particular reference to their combining friendship with an eye to the other needs of the old man or woman. A Mobile Library, Meals on Wheels, and Home Helps are available in many districts. The recreation club visited by the author was located in a house in its own grounds and had eighteen hundred members. "Everywhere was gaiety and activity, and a feeling of youth rather than age."

The rare insight of Mr. Keown may be judged from his comment on geriatrics as a "frightful word that would be easier to condemn if one could think of a better." The achievements of modern medicine are given full credit. "To meet an old lady who is excitedly re-mastering the technique of walking that she last learned at the time of the Indian Mutiny is a curiously touching experience." The National Health Act is criticized for its lack of attention to the old and for its insistence on the care of the healthy aged by the National Assistance Act. Since an old person can be well one day and sick another, urgent reconsideration of this divided responsibility is necessary.

A medical specialist is quoted in support of hostels for the handicapped aged who no longer need hospital care. A visit to a former private home converted to this use convinced the writer of the wisdom of this particular plan. He emphasizes the cheerful gay spirit of the place, its lack of written rules, and the necessity for infinite patience.

The concluding paragraph is full of meaning for the inhabitants of these United States. "We are likely to get into a greater muddle than ever unless we can clear our heads of the idea that responsibility for the old can safely be left to the Welfare State. At many points it appears barely to touch them, and without the enthusiasm of individual doctors and the public spirit of voluntary workers neither of the two major experiments I have been describing would ever have come into being. And whether one prefers the humane or the practical reasons for taking care of the old, nobody can fail to be impressed by the difference between ending one's life in static boredom and in cheerful activity."

F. D. ZEMAN

BOOKS RECEIVED

Books received since September 1, 1950, are acknowledged in the following list. In so far as space and time permit, some will be selected for review in a later issue, but it is unlikely that all will be reviewed.

Community Action for the Aging, New York State Association of Councils of Social Agencies, 105 East 22 St., New York 10, 1950, 15 pages, paper bound, 20¢.

Current Trends in the Relation of Psychology to Medicine, by Wayne Dennis, Robert H. Felix, Carlyle Jacobsen, Robert A. Patton, Yale D. Koskoff, Paul E. Huston, Nathan W. Shock, and Hans J. Eysenck, University of Pittsburgh Press, Pittsburgh, 1950, 189 pages, $3.75.

Design of Toxicity Tests, by W. L. M. Perry, Medical Research Council Special Report Series No. 270, London, 1950, 51 pages, paper bound, 1 shilling 6 pence. Copies may be ordered from the British Information Service, 30 Rockefeller Plaza, New York 20.

Education for a Long and Useful Life, by Homer Kempfer, Bulletin 1950 No. 6, Federal Security Agency, Office of Education, Washington, D. C., 32 pages paper bound.

Employment Problems of Older Workers, United States Department of Labor, Bureau of Labor Statistics, Washington, D. C., 23 pages, offset printed.

Planning the Older Years, edited by Wilma Donahue and Clark Tibbitts, University of Michigan Press, Ann Arbor, 1950, 248 pages, $2.50.

Practitioner, 165: 111-163, no. 986, August, 1950, Symposium of 8 papers on Care of the Elderly, 4 shillings.

Some Fact about Our Aging Population, Federal Security Agency, National Conference on Aging, Washington, D. C., August 13-15, 1950, 15 pages, offset printed.

Syllabus of Laboratory Examinations in Clinical Diagnosis, edited by Thomas Hale Ham, Harvard University Press, Cambridge, 1950, 496 pages, offset printed, paper bound, $5.00.

Young at Any Age, Legislative Document No. 12, the 1950 report of the New York State Joint Legislative Committee on Problems of the Aging, 192 pages, paper bound. Free copies of the report are available from Senator Thomas C. Desmond, Chairman, 94 Broadway, Newburgh, New York. Reviewed in this issue, page 76.

INDEX TO CURRENT PERIODICAL LITERATURE

NATHAN W. SHOCK
Gerontology Section
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The subject categories are those in *A Classified Bibliography of Gerontology and Geriatrics* by Nathan W. Shock to be published by Stanford University Press, Stanford, California. Only major headings will be used and the Roman numerals correspond to those given in the bibliography. In so far as possible, references are classified according to organ systems. Thus most of the material on Geriatrics will be found under the organ system involved in the disease. Cross references are indicated by number at the end of each section. When available abstract references are given (*B.A.* indicates *Biological Abstracts; P.A.* indicates *Psychological Abstracts).* Abbreviations for journals are those used in *A World List of Scientific Periodicals Published in the years 1900-1933,* 2nd Edition. For journals not listed, abbreviations were devised according to the general rules used in the above source. It is impossible to cover all journals and list all papers concerned with aging and the aged. Authors and publishers are requested to call attention to publications or to send reprints to the Gerontology Section, Baltimore City Hospitals, Baltimore, Md.

GERONTOLOGY

1507. Desmond, T. C., (Chairman): *Young at any age.* N. Y. State Joint Legis. Commit. on Probl. of Aging, Legis. Doc. No. 12, Newburgh, N. Y., 1950, 192 pp.

1508. Donahue, W. T., and C. Tibbitts, (Editors): *Planning the older years.* Univ. Mich. Press, Ann Arbor, 1950, 248 pp.

1509. Geill, T.: Gerontologic research in Denmark. *J. Geront., 4:* 341-344, 1949.

1510. Havighurst, R. J.: Old age — an American problem. *J. Geront., 4:* 298-304, 1949. Abstr: *P. A., 24:* No. 3131, 1950.

1511. Mountin, J. W.: Public health and the aging. *Publ. Hlth. Rep., Wash., 65:* 795-802, 1950.

1512. Schmitt, R. L.: Les ages de la vie. *Homoepath. fr., 26:* 203-216, 1950.

1513. Shock, N. W.: Broadening horizons in gerontology. Chap. 1, *in:* W. Donahue and C. Tibbitts, (Editors), *"Planning the Older Years"*, Univ. Mich. Press, Ann Arbor, 1950, pp. 9-30.

1514. University of Chicago. Institute on Problems of Old Age: Reading list. *Publ. Welf. Indiana, 59:* 10-13, 1949. Abstr: *P. A., 24:* No. 3142, 1950.

1515. University of Chicago Round Table: *Problems of aging. An NBC radio discussion.* Chicago, Aug. 13, 1950, 16 pp.

1516. Vaughan, E. H.: *Community under stress.* Princeton Univ. Press, Princeton, N. J., 1949, xi, 160 pp. Abstr: *P. A., 24:* No. 5180, 1950.

1517. Zahl, P. A.: Need there be death? *In:* T. C. Desmond, (Chairman), *"Young at Any Age"*, N. Y. State Joint Legis. Commit. on Probl. of Aging, Legis. Doc. No. 12, 1950, pp. 133-135.

See also No. 1983.

BIOLOGY OF AGING

IV. LONGEVITY

(heredity, diet, occupation, and sex differences)

1518. Carr, C. J., J. T. King, and M. B. Visscher: Delay of senescence infertility by dietary restriction. (Abstract). *Fed. Proc., Baltimore 8: 22,* 1949. Abstr: *B. A., 24:* No. 14656, 1950.

1519. Grab, W.: Lange Lebensdauer trotz Vitamin- und Mineralmangel und das Problem der Altersveränderungen. *Klin. Wschr., 28:* 230-232, 1950.

1520. Jalavisto, E.: (Nutrition, aging and longevity.) *Kotiliesi, 26:* 552-554, 1948.

1521. Logan, W. P. D.: Fog and mortality. *Lancet, 1:* 78, 1949.

1522. Metrop. Life Insur. Co.: Sex differences in mortality. *Statist. Bull. Metrop. Life Insur. Co., 31:* 7-8, Sept. 1950.

1523. Vitale, L.: (Old age and longevity.) *Rass. Clin. Terap., 49:* 53-70, 1950.

1524. Anonymous: Century of progress in longevity. *J. sch. Hlth., 20:* 145-147, 1950.

See also Nos. 1536, 1551, 1556, 1581.

IV-C. LONGEVITY: *Comparative Physiology*

1525. Griffin, A. M., and W. G. McCarten: Some

sources of variability in cultures of entozoic amoebae. I. The effect of age of culture, size of inoculum and amount of starch. *J. Parasit., 36:* 238-246, 1950.

1526. Griffin, A. M., and W. G. McCarten: Some source of variability in cultures of entozoic amoebae. III. Variation in vitality. *J. Parasit., 36:* 253-257, 1950.

1527. Griffin, A. M., and L. J. Michini: Some sources of variability in cultures of entozoic amoebae. II. The effect of age of inoculum. *J. Parasit., 36:* 247-252, 1950.

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See also No. 1652.

IV-H. Longevity: *Mortality Rates*

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1531. Denoix, P.: Mortalité par cancer en France pendant l'année 1946. *Bull. Inst. nat. Hyg., 2:* 403-426, 1947. Abstr: *B. A., 24:* No. 15663, 1950.

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1533. Metrop. Life Insur. Co.: Continued rise in longevity of industrial population. *Statist. Bull. Metrop. Life Insur. Co., 31:* 3-5, Aug. 1950.

1534. Metrop. Life Insur. Co.: American longevity near world's best. *Statist. Bull. Metrop. Life Insur. Co., 31:* 1-4, Sept. 1950.

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See also Nos. 1614, 1622, 1704.

V. Metabolism

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1543. Lovelace, F. E., C. H. Liu, and C. M. McCay: Age of animals in relation to the utilization of calcium and magnesium in the presence of oxalates. *Arch. Biochem., 27:* 48-56, 1950.

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1547. Peterson, J. E., and A. E. Hirst: Studies on the relation of diet, cholesterol and atheroma in chickens. *Amer. J. Med., 8:* 525, 1950.

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See also Nos. 1550, 1552, 1558, 1559, 1569, 1606, 1638.

VI. Nutrition

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1553. Kirk, J. E.: Vitamin studies in elderly subjects. (Abstract). *J. Geront., 4:* 327, 1949.

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ical studies in hypovitaminemia B_1. *J. Geront., 5:* 236-240, 1950.

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ORGAN SYSTEMS

I. Blood

(chemistry, coagulation, and morphology)

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1564. Kirk, J. E., and M. Chieffi: Vitamin studies in middle-aged and old individuals. III. Thiamine and pyruvic acid blood concentrations. *J. Nutrit., 38:* 353-360, 1949.

1565. Paluch, E., K. Mrozowski, and S. Poddebniak: (Hemoglobin levels of Polish workers.) *Pracovní lék., 2:* 1-9, 1950.

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1571. Witts, L. J.: Life of the red cell. *Brit. med. J., 4665:* 1314-1315, 1950.

See also Nos. 1541, 1546, 1549, 1577, 1578, 1579, 1586, 1589, 1590, 1591, 1592, 1594, 1604, 1609, 1629, 1696, 1821.

III. Cardiovascular System

(blood vessels, blood pressure, hypertension, blood volume, veins, and arteriosclerosis)

1572. Armstrong, H. G., and J. A. Rafferty: Cold pressor test follow-up study for seven years on 166 officers. *Amer. Heart J., 39:* 484-490, 1950.

1573. Barrow, D. W.: *Varicose veins; a guide to effective results.* P. B. Hoeber, N. Y., 1948, 169 pp.

1574. Biérent, N.: Phlébite avec spasme artériel; héparinothérapie. *Lille chir., 5:* 95-100, 1950.

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1576. Chapman, C. B., and T. B. Gibbons: The diet and hypertension; a review. *Medicine, Baltimore, 29:* 29-69, 1950.

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anti-coagulants. C. C. Thomas, Springfield, 1950, 416 pp.

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III-G. Cardiovascular System: *Heart*

(heart, anatomy and physiology; heart disease; coronary artery disease, and myocardial disease)

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1605. Bogoch, A., and E. F. Christopherson: Calcified cardiac aneurysms. *Ann. intern. Med., 32:* 295-308, 1950. Abstr: *B. A., 24:* No. 15061, 1950.

1606. Casten, G. G.: The effects of the aging process of acid-soluble phosphorus compounds in the myocardium of rats. *Amer. Heart J., 39:* 353-360, 1950.

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1608. Doscher, N., and C. A. Poindexter: Myocardial infarction without anticoagulant therapy; deaths, emboli and an analysis of factors influencing mortality. *Amer. J. Med., 8:* 623-633, 1950.

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(neurology)

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(ovaries, testis see Endocrine System)

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XV. Skeletal System

(joints, arthritis, and gout)

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